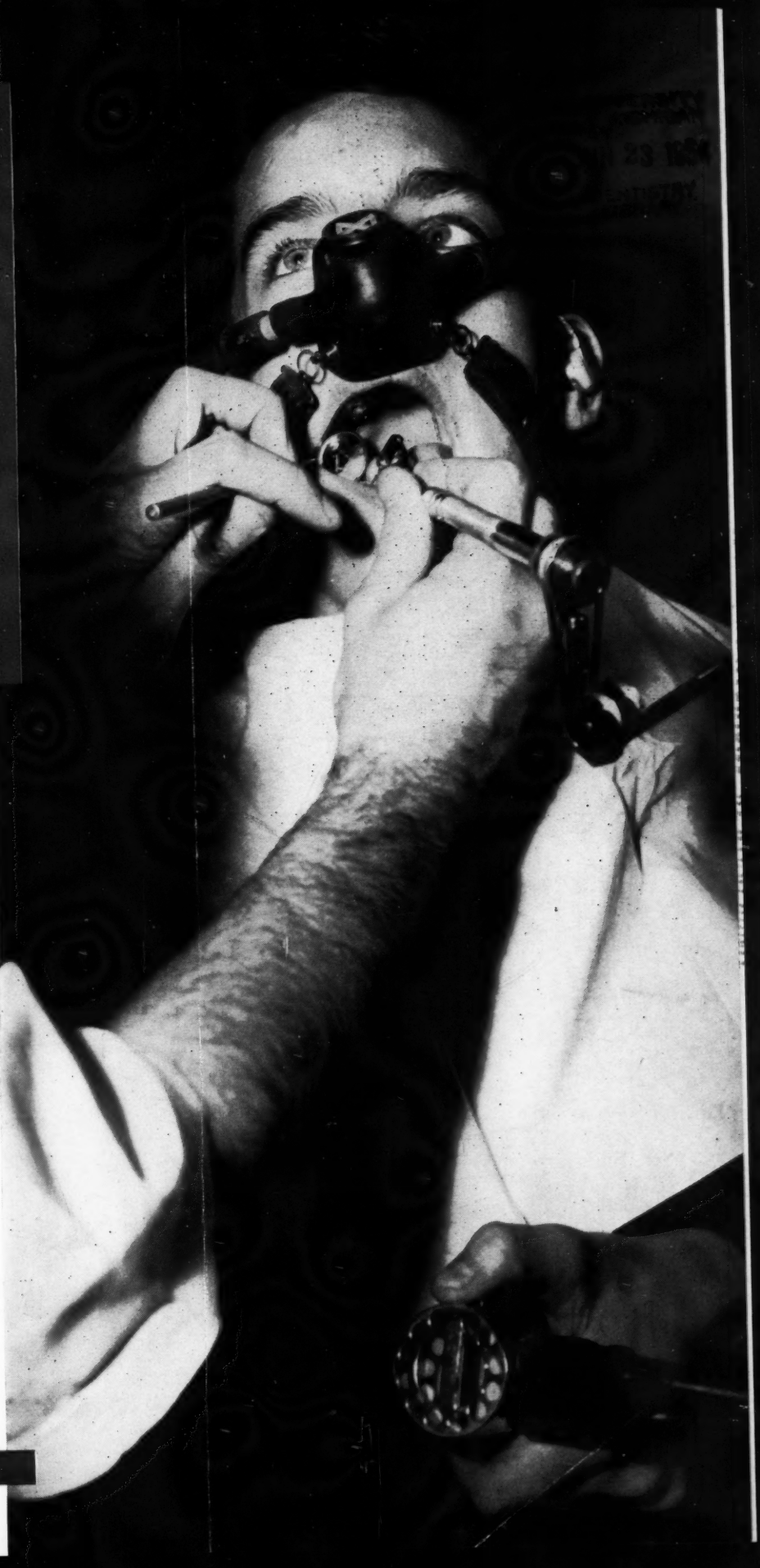
Dental Digest



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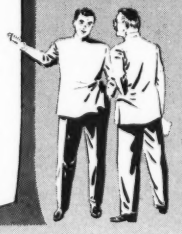

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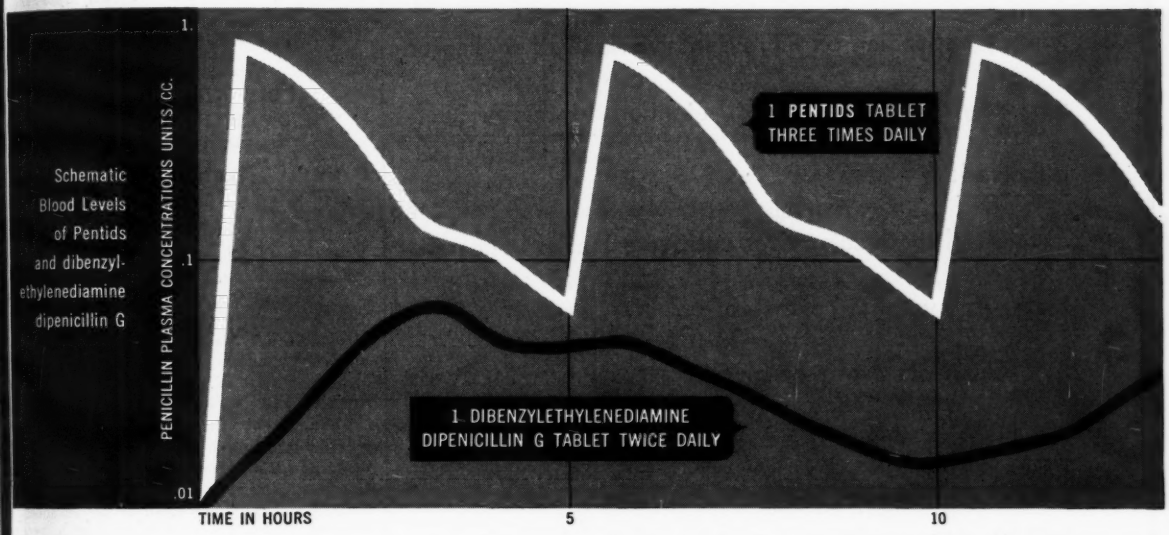

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TRILENE ANALGESIA

in the Dental Office

MANUEL M. ALBUM, D.D.S., Philadelphia

DIGEST

This article contains a step-by-step procedure for the administration of trichlorethylene as an analgesia in numerous operative techniques in the dental office. Self-administration of the agent is favored and the various types of procedures possible to complete with the aid of this analgesic are described.

General Considerations in Analgesia

The greatest obstacle the dentist must overcome in his daily practice is the fear experienced by patients undergoing dental treatment. Several factors combine to create fear: (1) the loud noise created through the dental engine, (2) the bur cutting into the tooth structure, (3) the puncture of the needle into the mucous membrane during local anesthesia, (4) the infiltration of the anesthetic fluid into the tissues, and (5) the discomfort resulting from the insertion of various mechanical devices in the mouth.

Experimentation — It has been thought that analgesia could be the solution to this important problem. Many types of analgesic agents, ranging from nitrous-oxide to somnoform have been tried. Each agent, no matter how satisfactory it promised to be, lacked certain properties pertaining to (1) the mode of administration, (2) the apparatus, or (3) to the structure of the agent in question.

Analgesia Defined — Analgesia, when properly understood, means the removal or decreasing of pain sensation without necessarily losing consciousness. If the patient is able to retain consciousness, it enables him to react more favorably to commands which he otherwise might not do in the presence of pain. Analgesia, in addition to being devoid of pain, should be safe, rapidly reversible, and have few side reactions, if any.

Satisfactory Agent in Use—The rediscovery of trichlorethylene or Trilene,* as the purified form is called by the dental and medical professions, presents new possibilities in the treatment of apprehensive and difficult patients.

History

Trichlorethylene was first described by Fischer,[1] a German chemist, in 1864 during the preparation of tetrachlorethylene from hexachlorethane. In 1911, K. B. Lehman[2] at Wurzburg University, published his experiments on the use of trichlorethylene for anesthesia on cats.

Early Applications—Trichlorethylene was used in the laboratory as an extracting agent and as an oil solvent. This contributed to its world-wide use by heavy industries. Plessner,[3] in 1915, showed that poisoning resulted among factory workers who came in contact with this drug.

Important Characteristic—One important symptom of the syndrome of acute trichlorethylene poisoning was analgesia of the area supplied by the trigeminal nerve. This peculiar characteristic of trichlorethylene was hailed by many persons as a cure for trigeminal neuralgia; but after abundant use was discarded in the late 1930's.

General Effects Noted—Jackson,[4] in 1933, at the University of Cincinnati, believed that trichlorethylene produced a general analgesia in which the trigeminal nerve was affected first. Its action was due to its influence in the central nervous system. He observed that a small amount went a long way. This was the first principle of modern trichlorethylene anesthesia.

Wider Experimentation — Striker[5] gave trichlorethylene as an analgesic to 304 patients for dental extractions and minor cauterizing operations. He found that he obtained relaxation by utlizing a small amount of the trichlorethylene with air. He concluded that although this was a useful drug, it could not be used for major surgery.

Drug Temporarily Discarded—As a result of its improper administration and supposed toxicity, the drug disappeared from use in this country. All publications on the subject came from Great Britain.

Successful Use Assured — The British, during World War II, were pressed for an anesthetic agent to substitute for chloroform; one which would be safe, practical, cheap, and noninflammable. They experimented with Trilene. Hewer, in 1941[6] and 1942,[7] reported favorably on its use

*The trichlorethylene used in this study was supplied through the courtesy of Ayerst, McKenna & Harrison Ltd., New York.

[1]Fischer, E.: (Abstract) Jenaische Zeitschrift fur Medizine und Naturwissenscheft **1**:123, 1864.

[2]Lehmann, K. B.: Experimentalle Studien Uber den Einfluss Technisch Und Hygienisch Wichtiger Gase Und Duampfe auf den Organismus 26-33, Arch. Hyg. Berlin **74**:1, 1911.

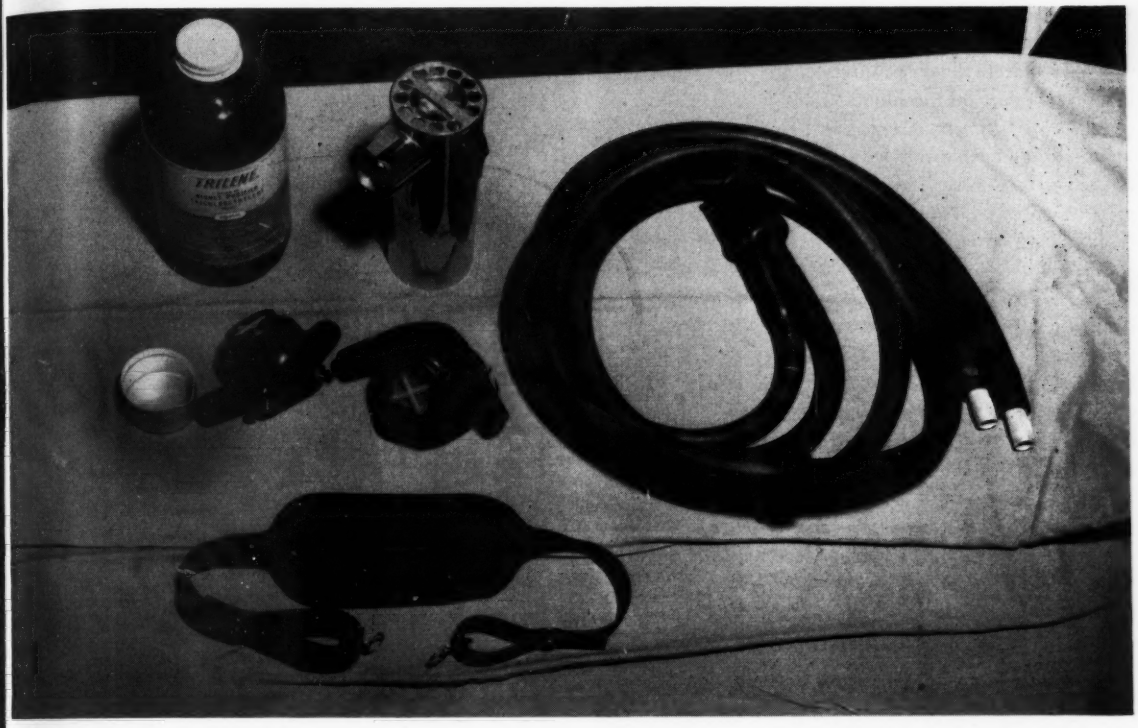
[3]Plessner, W.: Uber Trigeminuserkrankung infolge van Trichlorathylenvergiftung, Neuro. Zbe. **34**:916 (Nov.) 1915.

[4]Jackson, D. E.: A Study of Analgesia and Anesthesia, with Special Reference to Such Substances as Trichlorethylene and Vinesthese (Divinyl Ether), Together with Apparatus For Their Administration, Curr. Res. Anesth. **13**:198 (Sept.-Oct.) 1934.

[5]Striker, C.; Goldblatt, S.; Warm, I. S.; Jacksons, E. E.: Clinical Experience with the Use of Trichlorethylene in the Production of Over 300 Analgesias and Anesthesias, Curr. Res. Anesth. **14**:68 (March-April) 1935.

[6]Hewer, C. L., and Hadfield, C. L.: Trichlorethylene as an Inhalation Anesthetic, Brit. Med. J. **1**:924 (June 21) 1941.

[7]Hewer, C. L.: Trichlorethylene as a General Analgesic and Anesthetic, Proc. Roy. Soc. Med. **35**:463 (March 6) 1942.



1. ***The armamentarium used in the administration of trilene analgesia: (a) The bottle of trilene, (b) Duke University Inhaler cylinder, (c) 10 cubic centimeter-cup to pour trilene into cylinder, (d) nosepiece, (e) rubber tubing (f) neck band which attaches to nosepiece.***

in major and minor surgery. From that time on, the success of trichlorethylene was assured in medicine.

Chemistry

Solubility—It is not freely soluble in water, but is soluble in alcohol, acetone, and benzine. It mixes with ether and chloroform without any chemical change. A blue dye (waxoline blue) is added to the trichlorethylene to distinguish it from chloroform; and the trichlorethylene contains 0.1 per cent thymol for stabilizing purposes.

Reaction—Trichlorethylene is decomposed into phosgene and hydrochloric acid by exposure to strong light or by contact with hot surfaces. It should never be administered in a closed circuit apparatus or in contact with soda lime since dichlorethylene results from this reaction. The dichlorethylene then decomposes into phosgene and carbon monoxide.[8]

Pharmacology

Powell[9] showed that trichlorethylene was excreted by the lungs within twenty-four hours following the anesthesia. In addition to the lungs being a source of metabolism of the trichlorethylene, it is also metabolized in the body into chloral hydrate and subsequently into trichloracetic acid.

Final Metabolism—The remainder is reduced to trichlorethanol.[10] This end product is conjugated and forms glucuranide which, with the trichloracetic acid, appears in the urine.

Toxic Effects Negligible—Evidence of animal experiments and clinical investigation shows that toxic effects of trichlorethylene are negligible, and that there is less disturbance of liver function than occurs with either chloroform or ether.[11]

Trichlorethylene Analgesia an Adjunct to Anesthesia

Cardiac arrhythmias reported under trichlorethylene anesthesia were usually transient and appeared to do no harm to the patients.[12,13] Similar arrhythmias have been accepted as occurring under cyclopropane anesthesia.[14] The more serious cardiac arrhythmias occurred following the administration of excessive amounts of trichlorethylene during anesthesia.

No Increase in Bleeding—There is no evidence of an increase in bleeding at the operative site reported in any of the papers written on trichlorethylene and this was also found to be the case in the author's patients.

Occurrence of Fibrillation—Some investigators have stated that auricular and ventricular fibrillation occurred under very deep trichlorethylene anesthesia, particularly if epinephrine was used during the anesthetic.[15] This was not confirmed by clinical practice and there

[8]Armstrong, D. M.: Assessment of Liver Damage following Trichlorethylene and Di-Ethyl Anesthesia, Anaesthesia **2**:45 (Jan.) 1947.
[9]Powell, J. F.: Trichlorethylene: Absorption, Elimination and Metabolism, Brit. J. Industr. Md. **2**:142 (July) 1945.
[10]Butler, T. C.: Metabolic Transformations of Trichlorethylene, J. Pharm. and Exper. Therap. **97**:84 (Sept.) 1949.
[11]Humphrey, J. H., and McClelland, M.: Cranial-Nerve Palsies with Herpes Following General Anesthesia, Brit. Med. J. **1**:315 (March 4) 1944.
[12]Enderby, G. E. H.: The Use and Abuse of Trichlorethylene, Brit. Med. J. **2**:300 (Sept. 2) 1944.
[13]Ostlere, G.: The Role of Trichlorethylene in General Anesthesia, Brit. Med. J. **1**:195 (Jan. 31) 1948.
[14]Ostlere, G.: Monograph, Trichlorethylene Anesthesia, Livingston Ltd., 1953, p. 58.
[15]Ayre, P.: Trichlorethylene Anesthesia, Brit. Med. J. **1**:489 (April 17) 1943.

was no case of a death reported.[16]

Hemolytic Effects—Plotz[17] showed that trichlorethylene produced no hemolytic effect on the blood.

Irritating Effects Overcome—Inhalation of trichlorethylene during analgesia is a sweet agreeable smell to most patients. The vapor is slightly irritating to the respiratory tract and either atropine sulphate or scopolamine should always be given to overcome this.

Sole Use not Advised—The continued use of trichlorethylene produces unconsciousness and sometimes deep anesthesia with muscular relaxation. The sole use of trichlorethylene for surgical anesthesia is not safe.

Careful Administration Necessary—Analgesic doses of trichlorethylene do not influence respiratory rate or depth, but tachypnea and bradycardia can be produced easily during deep planes of trichlorethylene anesthesia, or by overdose of the agent. This can be avoided by careful administration of the drug. It is not necessary to give large amounts of the trichlorethylene since small doses produce favorable results. Again, it should be noted that tachypnea and bradycardia are both absent with first stage analgesia.

Symptoms with Use in Children—As a result of increased vagal tone, children show a moderate degree of bradycardia during analgesia. With increased depth in these children, the bradycardia becomes more marked and extra systoles may develop.

Rapid Recovery—During general anesthesia, trichlorethylene should not be used for the purpose of establishing muscular relaxation. Muscle-relaxing drugs have taken over this function in general anesthesia. The trichlorethylene should be removed as early as possible to produce quick and rapid recovery from the anesthesia. There is little postoperative anesthesia following trichlorethylene and recovery is speedy and pleasant.

Contraindications — Trichlorethylene should be used with caution in patients with a cardiac arrhythmia or other heart diseases. Women with toxemia of pregnancy should not be given trichlorethylene.

2. ***Pouring trilene into hole in the bottom of cylinder. This is absorbed by the cylinder lining and will not leak out. Bridge to be inserted in mouth.***

Indications—Trichlorethylene with nitrous-oxide and oxygen has been found effective for maintaining anesthesia in obstetrics, neurosurgery, thyroidectomy, esophagoscopy, psychiatry, and other minor operations. Album and Deming[18,19] used trichlorethylene successfully with nitrous oxide-oxygen in conjunction with succinyl choline under nasotracheal anesthesia for dental operations on difficult and handicapped patients. Under their technique, the entire mouth was rehabilitated at one sitting while the patient was in the hospital.

Trichlorethylene Analgesia in the Dental Office

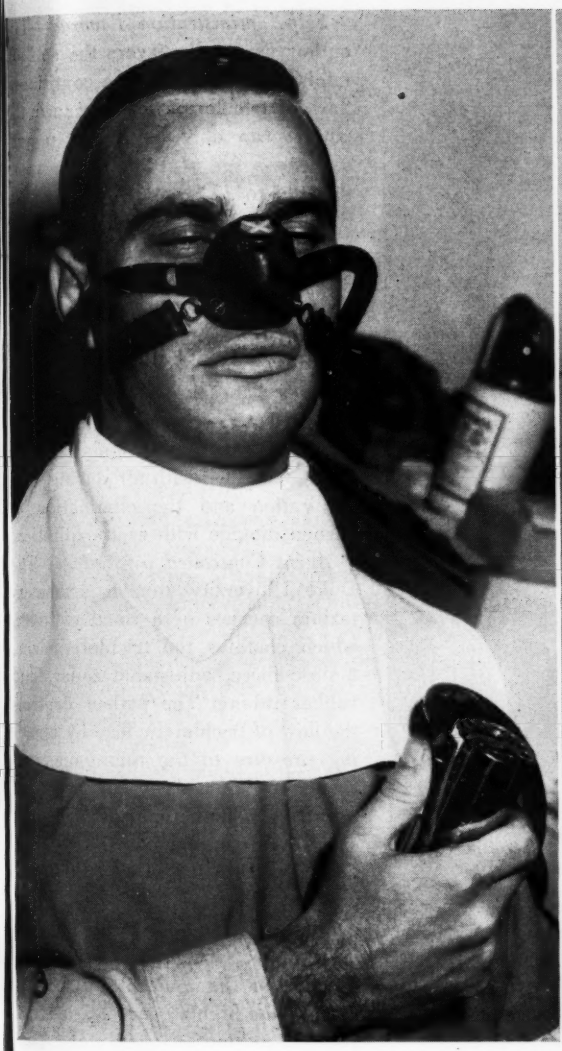
Knowing the history of trichlorethylene and its properties, the dentist will find it simple to use as an analgesic agent to perform difficult dental procedures in the office. It must be understood that trichlorethylene analgesia is not a panacea for every type of dental operation; but if used properly and in the right situations it can

[16]Hutchinson, B. G.: Anesthesia for Fenestration Operation, Brit. Med. J. **1**:1077 (May 6) 1950.

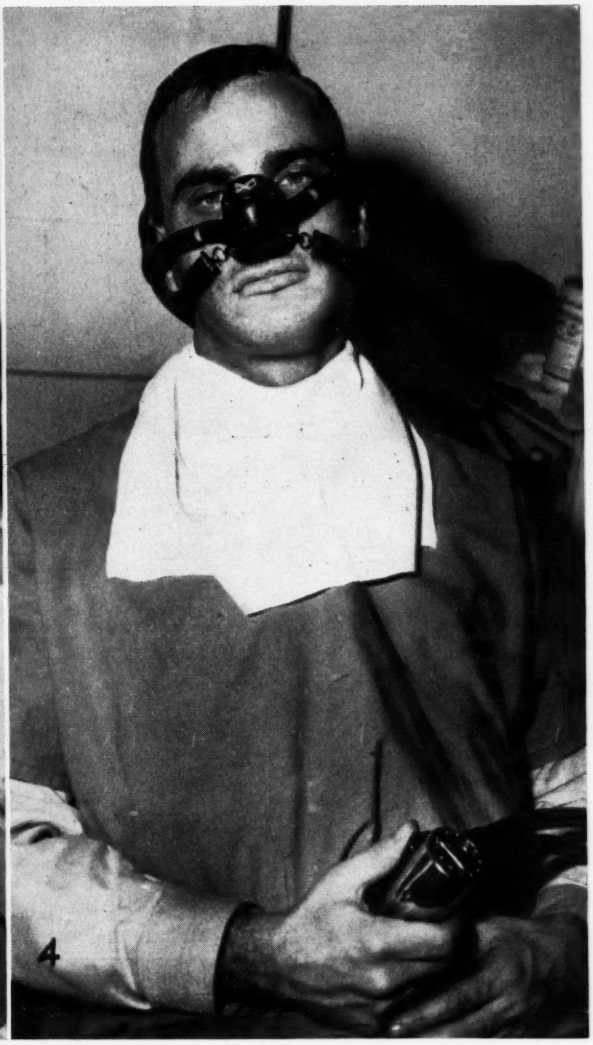
[17]Plotz, W.: Vergleichende Untersuchungen uber die hamolytische Wirkung einiger Chlorde rivate des Methans, Athans und Athylens, Biochem. Z. **103**:243 (Jan.) 1920.

[18]Album, M. M., and Deming, M. V.: Trichlorethylene Anesthesia for Operative Dentistry on Handicapped Patients. (In Publication)

[19]Album, M. M.: Operative Dentistry Under General Anesthesia for Difficult Patients, J. Dent. Children **20**:157 (4th Quarter) 1953.



3. ***The patient with apparatus in position. First phase of of trilene analgesia.***



4. ***The patient is under analgesia and procedure can now be done without discomfort. Note position of the cylinder in the patient's lap and the finger on the regulator.***

become a valuable asset to the dentist in allaying the fears of the patient and in reducing operating time for difficult and lengthy techniques.

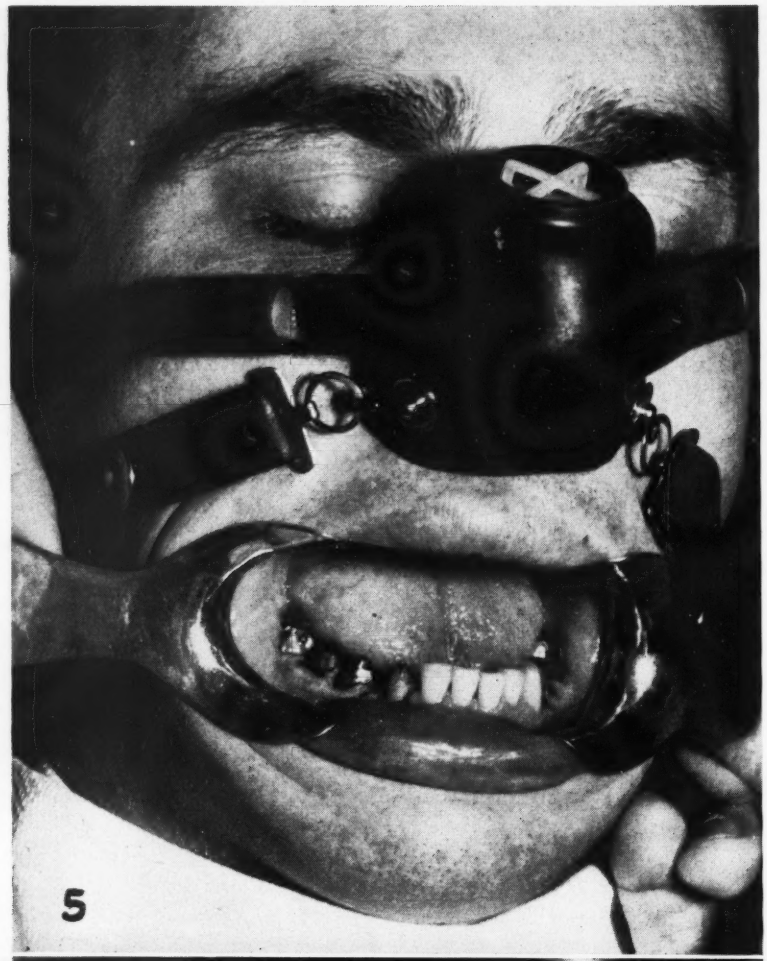
Dental Applications — Trichlorethylene analgesia is excellent for the following procedures:

1. Cavity preparations
2. Deep scaling
3. Curettage
4. Prophylaxis
5. Apprehensive patients
6. Fittings of crowns
7. Insertion of crowns
8. Copings
9. Transfers
10. Bridge construction
11. Some types of gingivoplasty
12. For the insertion of a particular type of local anesthetic solution
13. Extremely simple resorbed deciduous extractions

This analgesia is therefore suitable for many surgical and dental operations when loss of consciousness is not a requisite.

Caution Advised—Trichlorethylene analgesia should not be used for (1) extensive oral surgery, (2) deep extractions involving the deciduous or permanent teeth, (3) by itself in the preparation of teeth for porcelain jackets, veneer crowns, and other types of crown and bridge preparations.

Ideal Conditions for Administration—Analgesia is ideal when the patient controls his own administration. Psychologically this is an asset to the dentist because the patient knows that he can overcome any discomfort produced by the dental procedures. The new Duke University Inhaler affords the patient this opportunity and in addition produces an analgesia that is safe and efficient.



Self-Administration Favored—The author personally favors the self-administered inhaler over a continuous flow of trichlorethylene because the patient can only lapse into unconsciousness for a period of no more than 20 to 25 seconds. With a continuous flow, the patient is more apt to be carried completely past the analgesic stage into the anesthetic plane and be subjected to tachypnea and bradycardia from prolonged use. In addition, the Duke University Inhaler nosepiece and the rubber tubing attached to the cylinder have a flutter valve that ensures the combination of trichlorethylene with air during each inspiration and the elimination of carbon dioxide with each expiration.

Agent Controlled by Patient—The Duke University Inhaler armamentarium consists of a small cylinder, which contains the trichlorethylene, a nose piece, adjustable collar, and rubber tubing. The patient controls the flow of trichlorethylene by applying pressure to the thumb-operated regulator. When the regulator is not operating, the patient inhales pure air. When the regulator is working, the patient breathes a mixture of vapor and air.

Safety Factor—The thumb-operated regulator springs back to its initial off-position the moment the patient receives too high a concentration and goes beyond the analgesic stage. This safety factor is the difference between continuous flow and autoadministration of trichlorethylene.

Clinical Observation

Trichlorethylene, utilizing the self-administered Duke University Inhaler, was given to 178 patients, ranging from six years to 52 years, for various forms of dental procedures. Its use proved invaluable in the field of mouth rehabilitation where it helped eliminate the pain associated with tedious dental operations. In many cases of bridgework it removed the need for anesthetizing the mouth

5. *and* **6.** ***The appearance of the teeth and the apparatus prior to the insertion of the bridge.***

with local anesthesia to insert or try in gold thimbles, copings, crowns, and the finished bridge. The use of trichlorethylene in this particular phase of dentistry makes the duties of the dentist lighter and easier.

Apprehension Decreased—Patients who dislike or fear the needle associated with local anesthesia become more relaxed under trichlorethylene analgesia. They look forward to operative dentistry in contrast to apprehension on previous visits. Cervical cavities or gingival margin cavities which ordinarily are extremely painful in treatment responded well to this form of analgesia.

Specific Dental Uses — Trichlorethylene proved extremely useful in the following cases:

(1) Some types of gingivoplasties
(2) Simple copper band impressions
(3) Uncomplicated resorbed deciduous extractions
(4) Scaling
(5) Prophylaxis

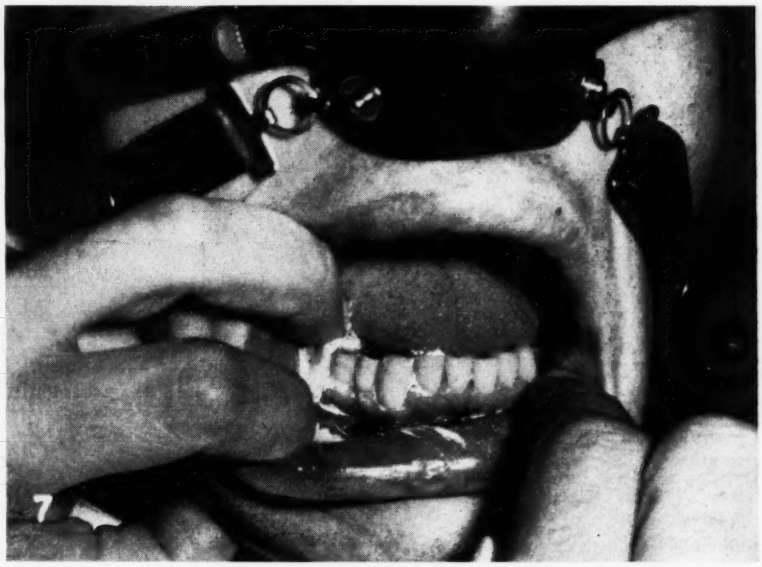
Minor surgery involved the following procedures:

(1) Cutting of the tissues
(2) Insertion and removal of sutures
(3) Removal of simple granulomas in the gingival tissue
(4) Cleansing of wounds
(5) Various types of uncomplicated minor surgery

Ineffective in Certain Procedures—Trichlorethylene analgesia should not be abused; its use for porcelain or veneer crown preparations as well as the extraction of difficult deciduous and permanent teeth is not recommended. In these procedures trichlorethylene will not prove effective and will destroy the confidence that the patient and dentist have in its use.

Procedures

Before trichlorethylene can be administered it is necessary that the patient be willing to cooperate and that he does not resist the procedure. Of the patients given trichlorethylene, 23 persons either thoroughly disliked the smell of the vapor or were afraid of going under during the analgesia; consequently they did not wish to have the operation repeated on subsequent visits.



7. ***Bridge cemented into position.***

Importance of Patient Education—The most important part of the trichlorethylene administration is the patient education associated with this technique. The patient is instructed to hold the cylinder in his lap and to listen carefully to the instructions of the dentist. The reason for informing the patient about the position of the cylinder is that he knows the nature of the object in his lap and also that in the event he receives too much of the trichlorethylene, the cylinder will not drop to the floor.

Method of Induction—1. The patient is instructed to take several normal breaths to accommodate himself to the vapor of the trichlorethylene. This is done by pushing the regulator up to Number 1 or 2.

2. The patient is told to inhale deeper and to push the regulator to 3 or 4.

3. After it is felt that he is receiving a fair amount of the trichlorethylene, the dentist can tell the patient to raise the regulator to 5 or the maximum whenever he feels any pain.

4. During the course of the trichlorehtylene administration the den-

Use of Trilene in Dental Office

Type of Dentistry Performed	*No. of Patients*	*No. of Visits*
Operative Dentistry	89	201
Bridge Construction Procedures	42	131
Gingivoplasty	12	12
Curettage	7	9
Prophylaxis and Light Scaling	2	2
Minor Surgery (Suturing, Cleansing wound)	10	10
Extraction of Simple (Resorbed) Deciduous Teeth	15	15

tist should speak softly and comfortingly to the patient during the entire operative procedure. This will allay any of the fears that the patient might have and will help him establish confidence in the apparatus.

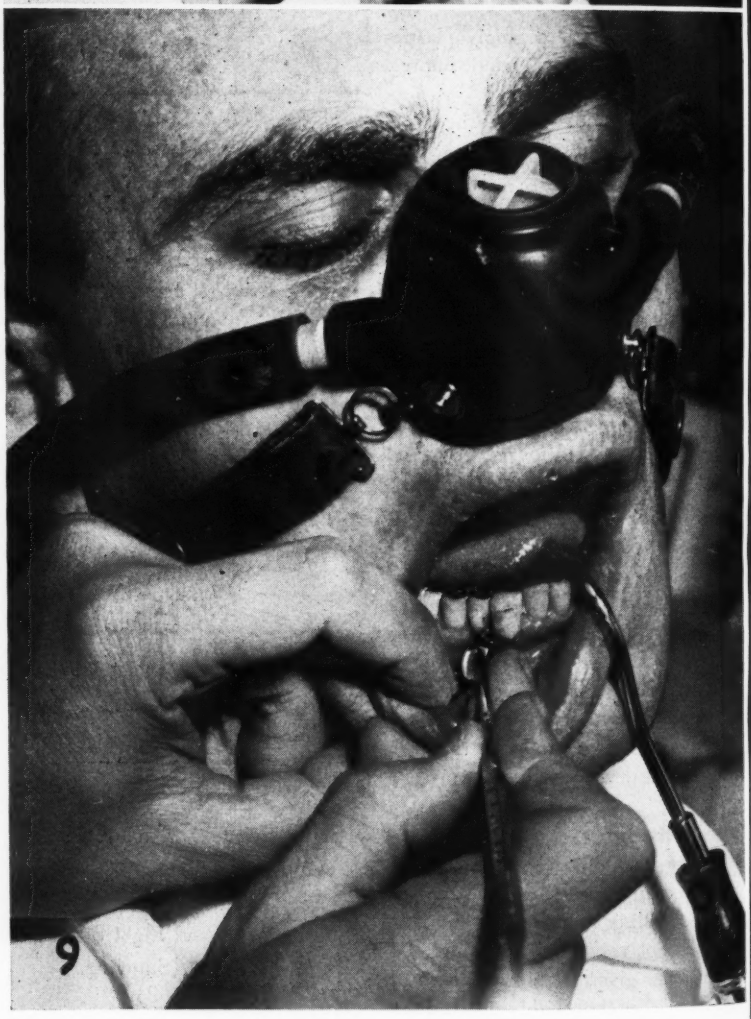
Routine Precautions—It is always advisable when working on a female patient that a third person (preferably female) be present during the operative procedures. If the patient is under 21 years of age, it would be protective to the dentist to have the consent of the parent or guardian prior to the use of trichlorethylene.

Epinephrine Combinations not Acceptable—The use of trichlorethylene in conjunction with a local anesthetic agent containing proportions of epinephrine is contraindicated. It is believed that cobefrin, xylocaine, or any of the other local anesthetic agents that do not contain epinephrine do not create any disturbance with the trichlorethylene, but that too should be investigated.

Combination with Local Anesthetic—Trichlorethylene was used in a number of instances to inject a local anesthetic solution without any epinephrine into the area to be worked on. The trichlorethylene was then withdrawn and treatment continued under the local anesthetic. In some cases a local anesthetic solution containing no epinephrine was used in conjunction with the trichlorethylene administration. This produced no ill effects.

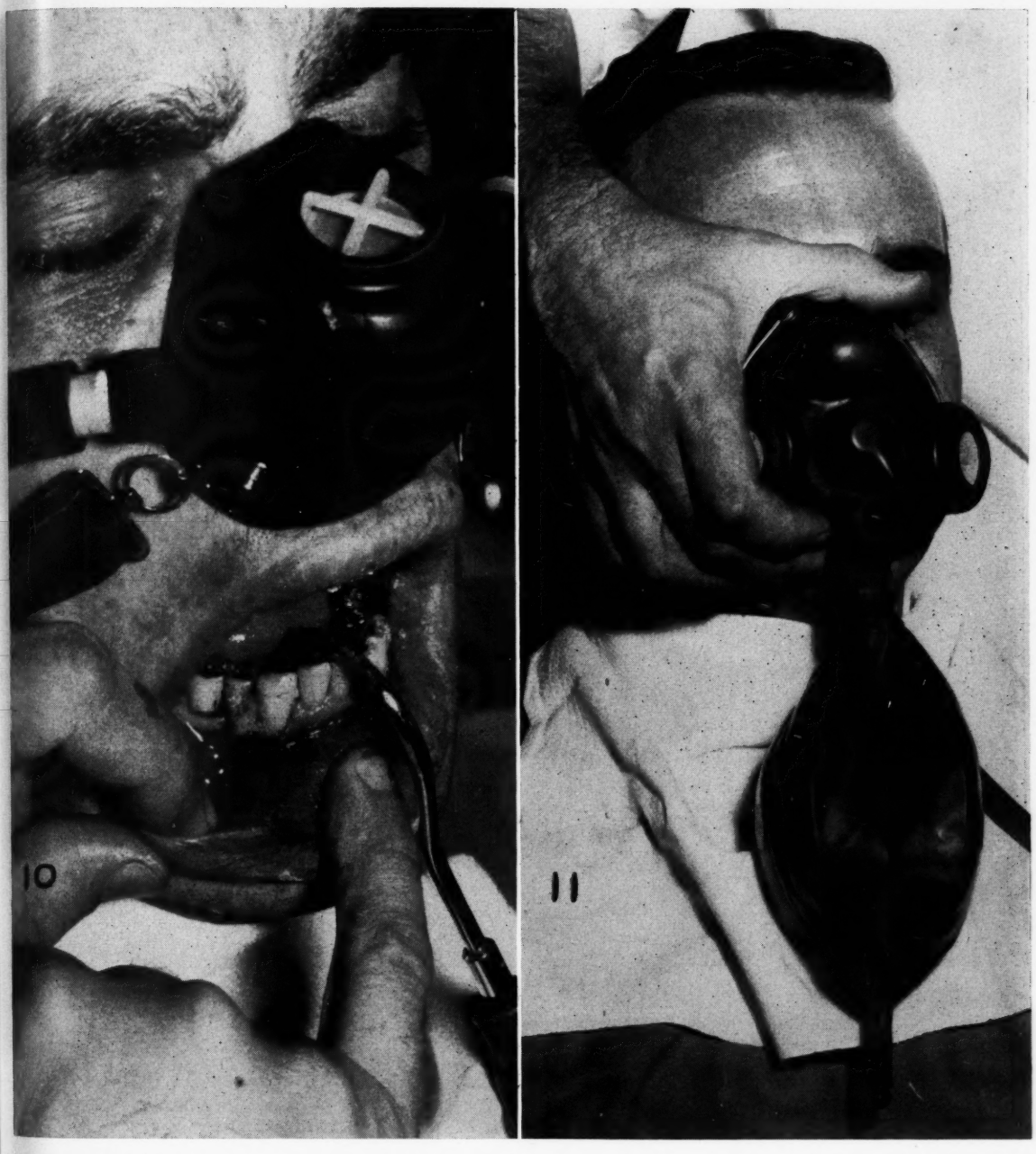
Premedication—The author likes to premedicate many of his patients prior to the actual operative procedures since he feels that they become more relaxed and a greater amount of treatment is completed. The best results with trichlorethylene were those obtained when the patient was given ½ grain phenobarbital and 1/150 or 1/100 grain of atropine sulphate or scopolamine. This was done prior to the administration of the trichlorethylene.

Relaxation Effected—The patient was more relaxed and the atropine helped to counteract possible laryngeal reflex irritation caused by the trichlorethylene vapor. The atropine and phenobarbital will provide easier operating technique for the dentist.



8. ***Shows excess tissue between cuspid and bicuspid that has to be incised.***

9. ***Tissue removed without pain to patient.***



10. ***Periodontal pack in position over involved area.***
11. ***Face mask in position immediately following removal of trilene. The patient is instructed to breathe deeply into the mask and to inhale the oxygen.***

Salivary Flow Decreased—In addition to the relaxation, the atropine will decrease the salivary flow which again is extremely useful to the dentist.

Trichlorethylene Recovery

Following the completion of the dental procedures, the trichlorethylene is stopped. The patient will lose its effects within a matter of minutes. Sometimes an oxygen mask is given to the patient and he is told to take several deep breaths of the inflowing oxygen. This will clear his head from the effects of the trichlorethylene vapor in a matter of seconds instead of minutes.

Oxygen an Available Adjunct—Although oxygen is not necessarily a part of trichlorethylene administration, it should always be available in the dental office and should be an integrate part of the equipment of the dental office.

Operative Time Element Influenced—Many patients will be surprised at

12. *and* **13.** ***Operative dentistry being done under trilene analgesia without discomfort to patient.***

the amount of dental therapy accomplished under this technique. The time element in some patients was of a different duration than they appeared to realize.

Side Reactions

These are almost nil and nothing to be concerned about. Only two patients complained of nausea following the analgesia. It was felt that this was due to administration of the drug following a heavy meal. Patients are instructed to eat lightly if they have a dental appointment immediately after mealtime.

Tingling Sensation Reported—Two patients, one male and one female, reported a burning sensation in the crotch and vaginal areas respectively. They also experienced a tingling sensation in their legs. This tingling sensation or feeling of pins and needles occurred in the finger tips and legs of 39 additional patients.

Sensation Dulled by Drug—It is suspected that the number of patients experiencing this tingling sensation could be larger but the analgesic stage sometimes masks this effect, since it is not evident following the removal of the trichlorethylene.

Circulatory Dilatation the Cause—The cause of these strange sensations seems to be the circulatory dilatation in various parts of the body created by the trichlorethylene.[20]

Summary

1. Trichlorethylene, utilizing the self-administered inhaler is safe, light in weight, and efficient. The intermittent nature of trichlorethylene administration by this technique prevents the patient from going beyond the analgesic stage for a long period of time. Consequently there is less opportunity to develop tachypnea or bradycardia.

2. A small amount of the trichlorethylene goes a long way.

3. The trichlorethylene is easily controlled and administered by the patient.

[20]Deming, M. V.: Personal Communication.

4. Simple operative dentistry becomes uncomplicated under trichlorethylene.

5. The patient should be educated to the use of the trichlorethylene by the dentist. This will maintain the ease and comfort of the patient while under analgesia.

6. Phenobarbital to relax the patient and atropine sulfate or scopolamine to decrease the laryngeal reflex irritation may be given to the patient prior to administration of trichlorethylene.

7. The trichlorethylene eliminates the need for local anesthesia during the insertion and fitting of gold thimbles, copings, crowns, and various types of bridge construction. This is especially true when it is necessary to anesthetize the entire mouth during the insertion of full mouth reconstruction cases.

8. Trichlorethylene can be used effectively for some types of gingivoplasties, simple copper band impressions, loose resorbed deciduous extractions and some forms of minor surgery. It should not be used for porcelain jacket or veneer crown preparations, difficult or deep deciduous or permanent extractions, since the trichlorethylene will provide inadequate analgesia.

9. Oxygen may be given following the administration of the trichlorethylene as it will help speed up the elimination of any unsteady feeling the patient might have. Oxygen should be an adjunct of trichlorethylene analgesia and dental office armamentarium.

10. Side reactions are few and relatively unimportant.

1930 *Chestnut Street.*

Major Surgery in Elderly Patients Relatively Safe

MAJOR SURGICAL operations can be carried out in patients over 70 years of age with reasonably low risks. In the opinion of Doctors John D. Stewart and Guy S. Alfano, Buffalo, New York, adequate surgical care should be made available to older persons not merely to save life but also to relieve discomfort and disability.

Conclusions were based on two studies of persons over the age of 70 years who underwent surgical procedures. One study consisted of 204 general surgical patients who underwent 290 major operations, and the other of 43 patients who had major abdominal surgery.

The average age of the 43 patients was 74.4 years, the oldest being 88, as stated in the February 20, 1954 *Journal of the American Medical Association.* Four of the patients (nine per cent) died; two deaths were caused by heart conditions.

The average age for the series of 204 patients who underwent 290 general surgical procedures was 76.8 years, the oldest patient being 94. The overall mortality rate was 13 per cent (39 patients). The doctors pointed out, however, that 21 of the 39 deaths probably had little relation to the surgical operation; 17 of the 39 patients who died had advanced cancer. If these deaths were excluded, the mortality rate was approximately eight per cent. Respiratory and heart and blood vessel complications were most commonly noted in the fatal cases.

There were no complications following 190 operations in the larger group. When complications occurred, the commonest were those affecting the respiratory system, the surgical wound, and the heart and blood vessels.

Considering the age of the patients in these studies and the severity of their diseases, it is concluded that the surgical operations were well tolerated.

In considering the problems of preoperative and postoperative care of the elderly, "one is impressed with the point that they differ only in degree as compared with the surgical care of younger patients," the doctors stated. The margin of safety is less, and sharper attention to details is necessary. Expert nursing care is a potent factor in recovery. They added that the daily routine of the elderly surgical patient should be upset as little as possible, and that he should be returned to his normal environment and activities as soon as practicable.

From *Journal of the American Medical Association* **154**:643-646 (February 20) 1954.

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Impression Method for Construction of a Stable and Efficient Complete MANDIBULAR DENTURE

JACK SMOKLER, D.D.S., New York

DIGEST

The construction of a serviceable and efficient full mandibular denture is a difficult problem. Impression techniques, the establishment of proper occlusal and jaw relations, precise laboratory procedures, and patient cooperation are important factors involved in the successful result of the technique. A method for cooperating the coordinative action of the muscles of mastication, deglutition, and expression in an impression technique is described in this article and step-by-step instructions are presented for completing the technique.

Considerations in Stability

Stability of the lower denture during function is an important objective and any means which may be used to achieve this purpose should be given careful consideration. In comparison to the maxillary, there is less base area to cover in the mandibular edentulous jaw and the presence of a complex, highly labile musculature tends to dislodge rather than stabilize the denture during mastication. When eating, a bolus of food is interposed between the occlusal surfaces of the teeth which also tends to dislodge the lower denture.

Application of Pressure—All dentists have been confronted with the problem of the application of pressure in taking impressions: whether to compress the tissues, use no pressure, or depend on the tactile senses in this phase of treatment. It is the author's opinion that artificial substitutes can be most efficient if the patient will exert normal functional pressure during the impression stage.

Role of the Muscles—It is extremely important that in the treatment of the edentulous patient, the coordinative interplay and action of the muscles of mastication, deglutition, and expression be considered.

Coordinative Action Transferred—In the action of mastication, trituration, swallowing, and speech these muscles exert coordinative action and forces which will be related to artificial substitutes when the natural teeth are lost. For this reason an attempt is made to incorporate the actions of these muscles in an impression technique for the stabilization of the artificial mandibular denture.

Materials Used—The following case illustrates the objective described. The impression materials of choice in this method are those which remain moldable at body temperatures and wherein the set is controlled by the operator. The impression waxes are preferred by the author. The case described was constructed with a metal base, which may be dispensed with and a full acrylic denture made instead.

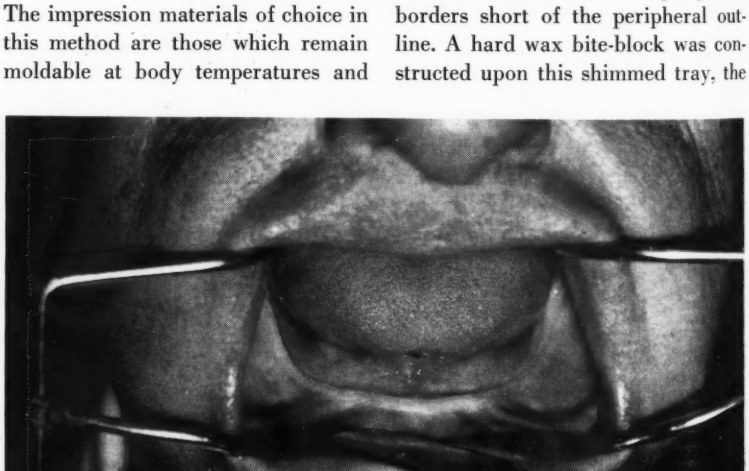
Procedure

A patient, male, presented for full upper and lower artificial dentures (Fig. 1). The following steps were taken:

1. A muscle-molded modeling compound and plaster wash impression of the upper jaw was taken, a model poured, and bite-block constructed on an acrylic baseplate.

2. An alginate impression of the lower jaw was taken.

3. On the mandibular cast, the peripheral outline was scribed and a spacer of 30-gauge baseplate adapted. Over this a tray of self-curing acrylic was fabricated, with the peripheral borders short of the peripheral outline. A hard wax bite-block was constructed upon this shimmed tray, the



1. ***Intraoral view of the edentulous mandible.***

width of the occlusal table approximating the buccolingual diameter of bicuspid and molar teeth. The lower tray was tried in the mouth to correct possible overextension or muscle impingement. The vertical dimension was established with upper and lower bite-blocks in position. Impression wax was applied to the ridge area, and peripheral border of the lower tray, and luted to it with a hot spatula. The upper bite-block was inserted in the patient's mouth; adhesive powder may be used to secure it if necessary. The wax on the lower tray was flamed, softened, tempered and gently placed within the patient's mouth. To place the tray in position the patient was asked to close, suck, and swallow several times. The impression was chilled, removed from the mouth and deficiencies in wax coverage were corrected.

Stability Tested—1. The impression was reinserted, placed in position, as described, and a ball of moistened absorbent cotton about ½ inch in diameter was introduced into the patient's mouth. He was told that this simulated a morsel of food and was instructed to chew it, move it about, swallow, and cleanse the buccal sulcus with the tongue.

2. If the patient is a smoker have him puff on a cigarette, converse with him and let him perform all natural functional movements.

Impression Removed—1. This procedure should be continued for about 10 minutes and the impression examined intermittently to ascertain ridge coverage and full peripheral border contour.

2. When stability is evident (this can also be substantially checked by the patient's reaction) chill, remove, and set aside in cold water.

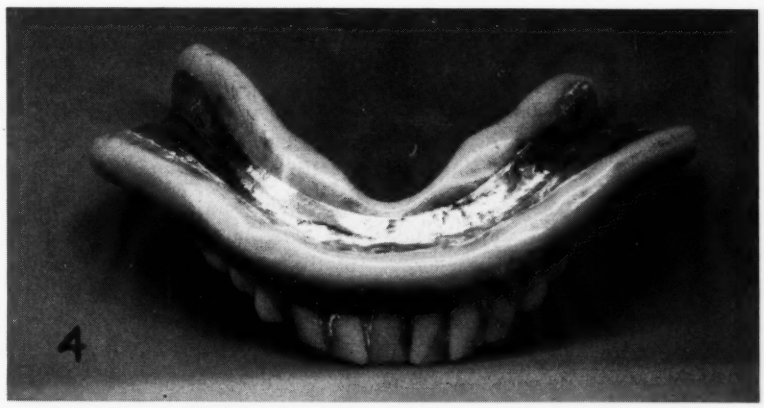
3. The impression is then boxed, the full peripheral border included and a cast poured in stone (Fig. 2).

Retention Provided—In this case a thin metal alloy base was utilized as part of the lower denture, which was cast short of the peripheral outline. Nail head lugs provided retention along the peripheral border and on the lateral aspect, below the ridge.

Preparation for Finishing—1. A bite-block was constructed on the metal base, the vertical dimension and jaw relations established, the cases set up, tried in the mouth, and prepared for finishing.

2. ***Impression and model.***

3. ***Case invested in sectional flask. Impression wax cut away on right side of denture to illustrate concavity present prior to completion of flange.***



4. ***Completed lower denture.***

2. Special consideration is given to the wax-up of the entire buccal flange which should be concave and as thin as possible.

3. The entire peripheral roll should

be included on the buccal and lingual borders.

4. The cases were processed, inserted, and worn for a period of about two weeks; during this time all necessary adjustments were made.

Denture Ready for Completion—After this time the buccal and labial flanges of the lower denture are ready for completion:

1. The concavity was thinned down and roughened with suitable stones without encroaching upon the peripheral roll.

2. It was then spotted with tiny specks of sticky wax.

3. Impression wax was applied and luted to the buccal and labial surfaces from the cervical margins of the teeth to the peripheral border.

4. The wax was flamed, softened, tempered, and the denture was placed in the patient's mouth.

Denture Tried—1. A ball of moistened absorbent cotton was again introduced into the patient's mouth and he was instructed to repeat the movements executed during the primary impression phase. He was told that by holding on to the denture with his cheeks during this exercise stability could be obtained.

2. Light manipulation of the cheek and lips will help to accentuate the muscle molding of the flange.

3. Excess wax which exuded over the teeth or periphery was removed, the case replaced in the mouth and remolded.

4. When no more excess wax could be displaced, and the buccal and labial flange were contoured, the denture was chilled, removed (Fig. 3), and processed.

5. The buccal and labial surfaces are buffed lightly in finishing.

Few Adjustments Required—The author has observed that the lower denture (Fig. 4) constructed in this manner is stable and efficient during function. After occlusal balance has been obtained few adjustments are required.

Summary

1. A method of incorporating the coordinative action of the muscles of mastication, deglutition, and expression in an impression technique for the construction of a mandibular denture has been described.

2. The pressures applied in the impression phase are exacted by the subject's individual functional forces, so that there is no undue compression of the tissues.

3. The buccal and labial flanges of the denture are the result of muscle molding, and provide properly contoured surfaces for stabilization by the facial muscles.

4. This impression method is in harmony with forces which tend to retain, rather than dislodge, the denture.

5. Occlusal harmony and functional occlusal balance, of paramount importance in the construction of artificial dentures, must be established, or the dentures will be displaced during the functional excursions of the mandible.

6. It has been observed that dentures constructed as outlined in the manner described have added stability when the jaws are at rest, during speech, and also during the chewing cycle.

7. Fifteen cases treated in this way have been functioning satisfactorily for a period of one to three years.

8. From the patient's viewpoint, and in comparison with their previous dentures, this method provides them with a more comfortable, secure, and efficient restoration.

9. There is little or no impingement or overextension of the peripheral border of the soft tissue, thereby reducing adjustments to a minimum.

10. Impression materials at present are not entirely satisfactory.

16 *Park Avenue.*

Serial Study of Effects of Finger Sucking

ALLAN T. RUTTLE, D.D.S., M.S.; WILLIAM QUIGLEY, D.D.S., M.S.; JOHN T. CROUCH, D.D.S., M.S.; and GEORGE E. EWAN, D.D.S., M.S.: University of Michigan, Ann Arbor, Michigan

Summary

The maxillary arch form is modified in thumb and finger suckers by elongation of the anterior segment. This acts to produce spacing, labial inclination, and protrusion of the maxillary incisors. There is a definite opening action in the anterior region. True and apparent overjet are increased strongly, although apparent overjet shows a tendency to increase in the nonhabit, as well as the habit, series.

Sucking habits act in opposition to any inherent tendency for a transition from maxillary deciduous anterior spacing to crowding of the permanent anterior teeth. This effect is not evident in the mandibular anteriors.

The frequency of distortion of the maxillary arch width at the permanent cuspid level is limited. In a few cases, however, where a distortion does occur it progresses to a rather marked degree.

Modification of the mandibular arch width at the deciduous first molar and the permanent first molar merely approaches statistical significance. Clinical utility of this fact, however, is questionable.

Maxillary arch width, with the infrequent exception of the permanent cuspid area, is unaffected.

Contrary to most publications, the effect of thumb and finger habits on the molar occlusion merely approaches statistical significance, and does not attain clinical utility.

From *Journal of Dental Research* **32**:746-747 (December) 1953.

Surgical Correction of IMPACTED TEETH *for Teenagers*

WALDO BECKLEY, D.D.S., Borger, Texas

DIGEST

Many impacted teeth in teenagers may be surgically placed to erupt in one or two operations. In extreme cases these teeth may actually be placed in proper alinement. It is preferable to do this in two or three steps, however, to preserve the vitality of the tooth. Many teeth otherwise impacted permanently may be brought into use and the proper occlusion of the teeth secured. It will be found that ingenuity and practical considerations must be used in dealing with these situations. The cases presented are unusual cases, each having individual features not encountered in the others. Directions for the procedure to be followed in each case are given.

Basic Principle Uncomplicated

The basic principle in the technique followed in these cases is simple:

1. A space is made into which the impacted tooth can be moved so that it may be in normal position to erupt properly.

2. A pack of surgical cement is applied to keep the tooth from moving back into its original socket and to keep a passageway open through which the tooth can erupt without further interference.

A tooth that is to be moved as much as 3 millimeters should have a root that is not completely formed. Preferably, the apical third should be in the formative stage, soft, pliable, and with a wide open foramen.

Armamentarium Required

The following instruments and materials should be sterilized and available for use:

1. Scalpel
2. Cogswell or Garner Hatchet Knife
3. Tissue retractor
4. Bibevel drills, small and medium size
5. 701 fissure burs
6. Small narrow hand chisel
7. Miller's Number 3 and 4 elevators or suitable root teasers
8. Curettes, small size
9. Round beak rongeurs
10. Number 12 stainless steel wire
11. Suture, suture holder, and scissors
12. Wondrpak, or similar material

Occasionally where dense bone is to be removed in the palate, a special Gardner bone chisel and mallet will be needed. (Special chisel is made extra long to protect the operator's hand.)

Local anesthesia is the anesthetic of choice.

Case One

In this case the lower second bicuspid was impacted semihorizontally between the lower first bicuspid and the first molar.

Procedure — The following steps were taken:

1. A flap was made to expose all of the crest of the ridge; the tissue was retracted and bibevel drills were used to remove the bone over the crown of the tooth.

2. The opening was enlarged by the use of a bibevel drill or 701 fissure bur sufficiently large to accommodate the tooth when moved into the desired position.

3. Drills were run slowly to prevent heat generation. The bone on the mesial and distal of the bicuspid was disturbed as little as possible. Occasionally the hand chisel was used to remove some of the bone.

4. With hand pressure the bone was smoothed and small pieces were broken off and removed with suction. Sound surgical judgment will indicate when this is the proper procedure.

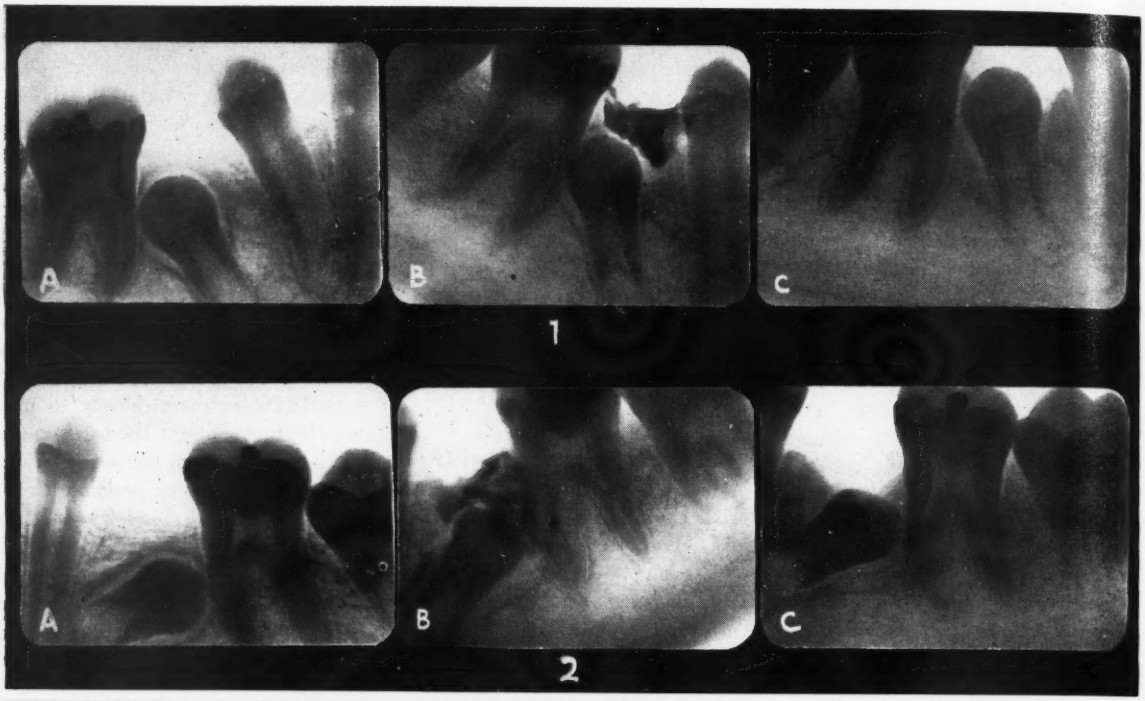
Stabilization of Tooth in New Position—1. When by trial movements the opening was large enough to accommodate the tooth a curette or elevator was used to ease the tooth carefully out of its socket and gently move it into a vertical relationship.

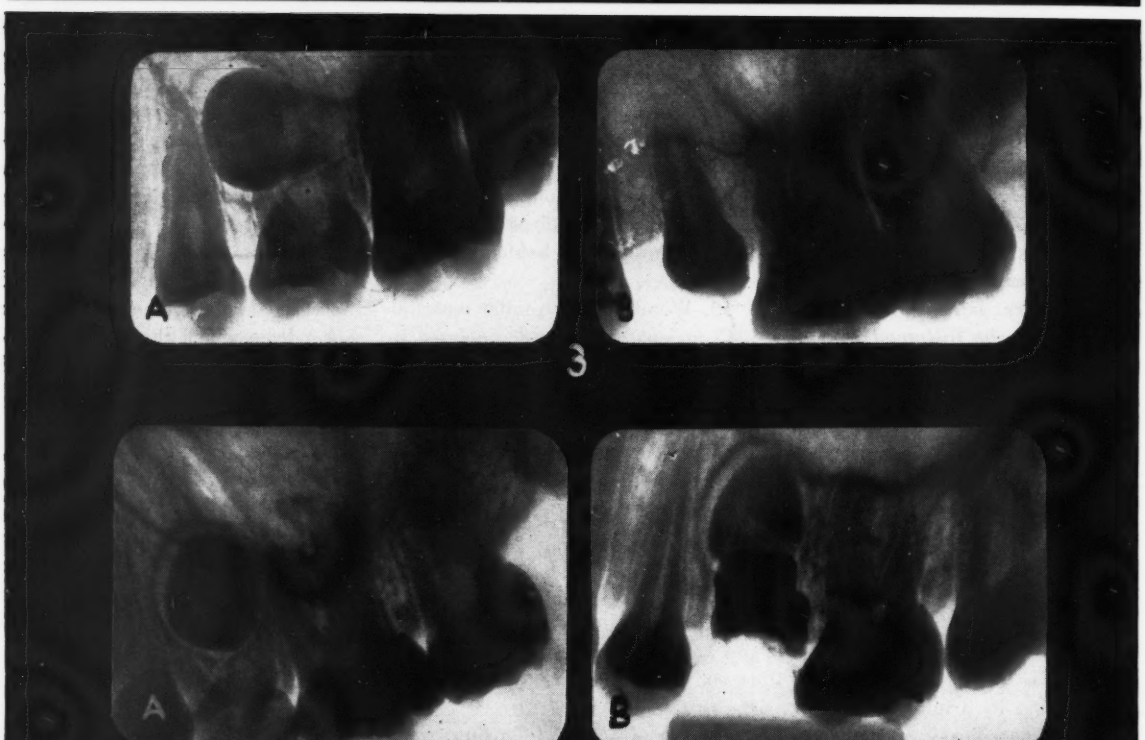
2. To prevent the tooth from returning to its original socket, a thick mixture of surgical cement was mixed and wedged between the tooth and the socket from which the tooth was removed. Some of the material should be allowed to extend over the occlusal of the tooth.

3. Enough of the tissue was removed to leave the surgical pack exposed.

4. The remainder of the tissue is sutured into position. Sutures should incorporate some of the material to help hold the pack.

Healing Process—The surgical pack may be removed within a week, and replaced with a smaller pack over the occlusal part of the tooth. The organized blood clot and normal healing will hold the removed tooth in its new position. The pack will prevent the tissue from growing back over the tooth which will erupt more rapidly if the area above the crown is kept open with surgical cement (Fig. 1, A, B, and C).





1. *(A) Preoperative view. (B) Second pack in position. (C) Results two months after surgery.*

2. *(A) Before surgery. (B) After surgery showing the pack wedged in position to prevent the tooth from shifting back into the socket. (C) Results two months later. A second operation should be performed.*

3. *(A) Preoperative view. (B) Six months after surgery. Periodontal membrane around the tooth is clear. Bone has not yet filled in the original socket.*

4. *(A) Preoperative view. (B) Postoperative view.*

Case Two

When the tooth is impacted horizontally, the surgical technique is approximately the same except that more bone must be removed to facilitate the change in position of the impacted tooth. More of the root of the tooth must be exposed. Sometimes this can be compensated for by leaving more bone over the crown of the tooth on the side from which the tooth is moved.

Bone is Conserved—An attempt should be made to leave as much bone as possible and still make a space into which the tooth may be moved to its proper relationship.

Two Operations Sometimes Advisable—It may be advisable to move the tooth in two steps, comprising two separate operations. This is at times sound surgical judgment and may be an aid in safeguarding the vitality of the tooth. (Fig. 2, A, B, and C).

Case Three

In the operation described in this case the maxillary second bicuspid was moved from an impacted position and placed in almost its proper relationship in the socket. This measure is advised only in extreme cases where there might be danger of injury to normally placed teeth by moving the impacted tooth in several operations.

Procedure—1. A flap was made in the palate and the deciduous tooth was removed.

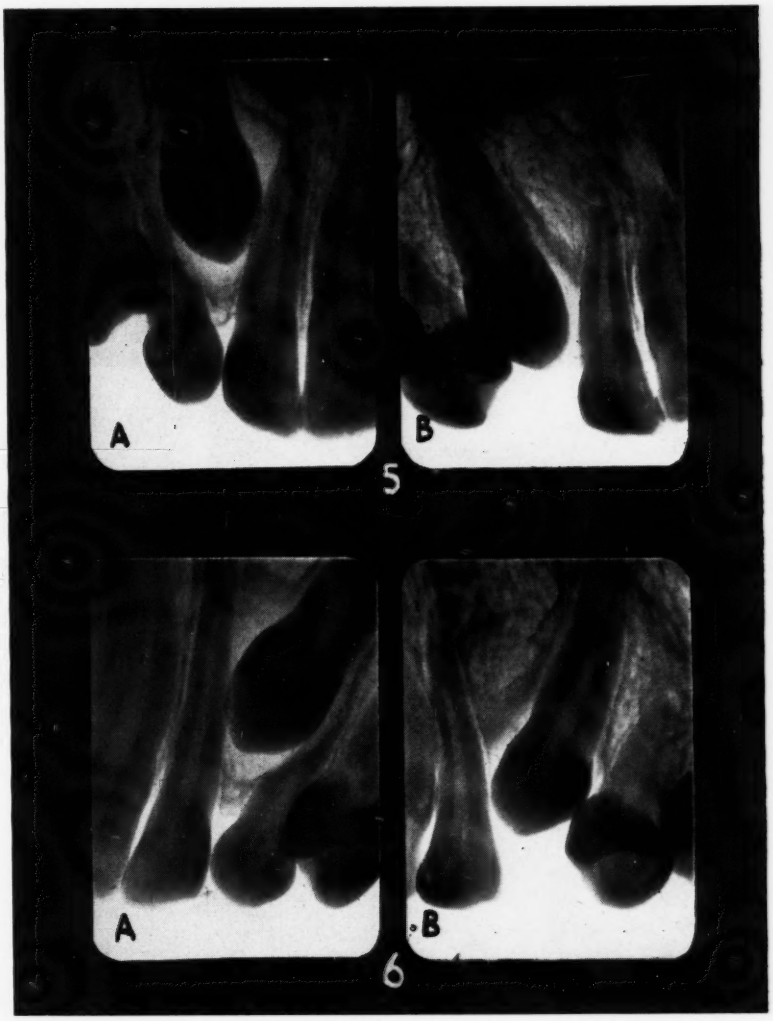
2. Bone was removed from over the impacted tooth.

3. The mallet and chisel were used in this instance in addition to other instruments described.

4. Bone in the center of the deciduous tooth socket was removed to permit placing the impacted tooth in its proper position.

Bicuspid Removed—1. The first bicuspid was encircled with a Number 12 stainless steel wire and twisted to cover the distance to the molar. The molar was then encircled, the wires cut, and the ends bent back for the comfort of the patient.

2. The bicuspid was removed from its socket as carefully as possible.



5. *(A) Preoperative view. (B) Result three months later.*

6. *(A) Preoperative view. (B) Results three months later.*

3. The buccal cusp was placed buccal to the twisted wire which allowed the wire to be between the buccal and lingual cusps of the tooth. This wire so placed will keep the tooth from being dislodged from its new socket.

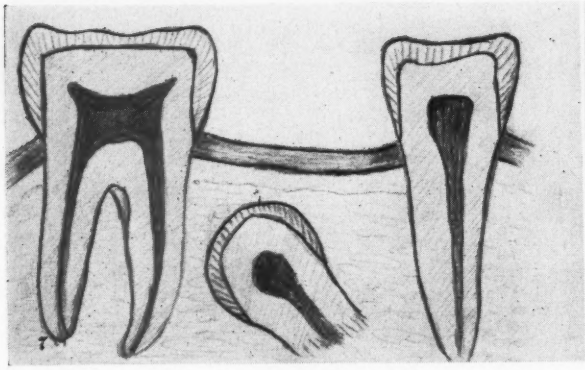
4. The gingival tissue is fitted and sutured around the crown of the tooth as firmly as possible.

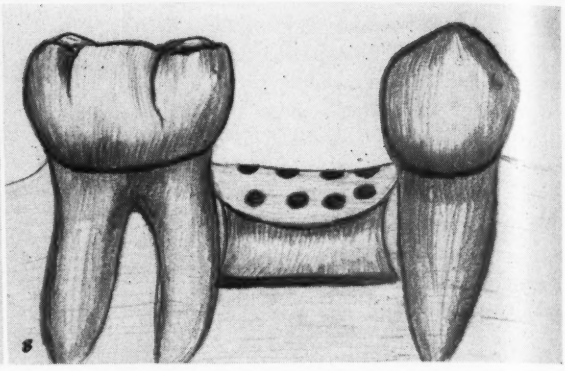
Observation—No pack was used in this case because the tooth was erupted surgically. The tooth should be carefully observed with roentgenograms every few months (Fig. 3, A and B).

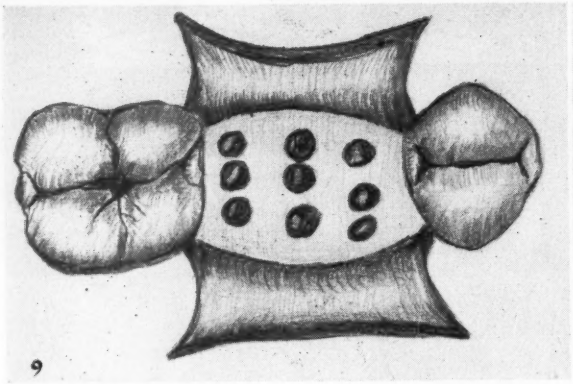
Case Four

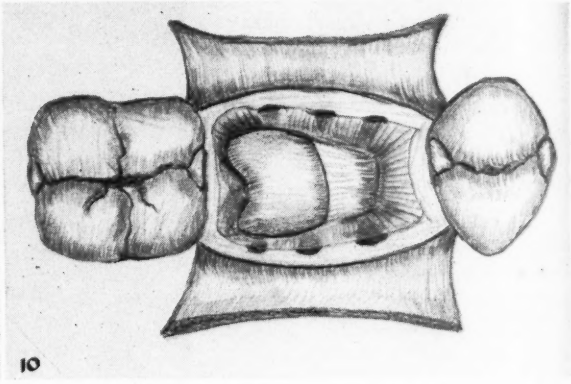
The problem in this case was the horizontal impaction of a maxillary second bicuspid in lingual to buccal version. Most of the tooth was in the palatal area.

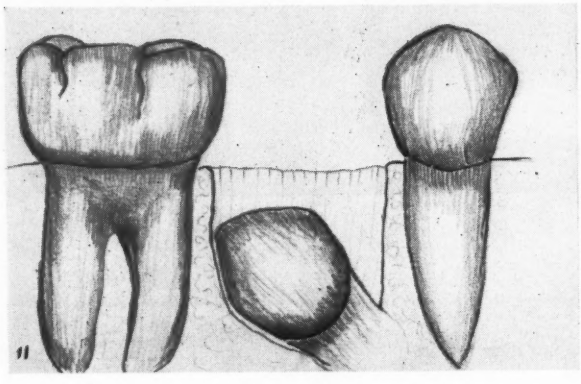
As the tooth was separate from the roots of the bicuspid and molar, the movement of the tooth was planned for two or three operations, the first of which is shown in Figure 4A, before operation, and 4B after operation. Note the pack in place to keep the area open and aid in holding the tooth in the new position. Observe that the tooth was moved approximately half way to normal position. In two or three months the tooth can be moved into its correct relationship to the other teeth (Fig. 4, A, and B).

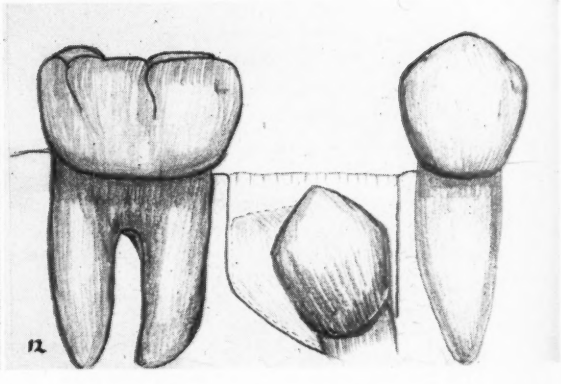












7. *Cross section showing impacted bicuspid.*

8. *The tissue is retracted and holes are drilled in the bone with a bibevel drill. Warm sterile water and suction is used to cool the bur and carry away debris.*

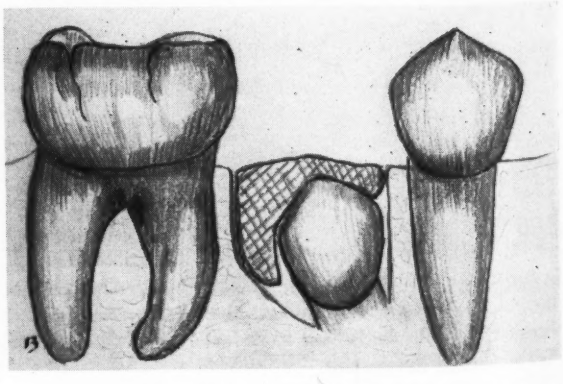
9. *Occlusal view. The tissue retracted to lingual and buccal. Holes are drilled in the bone. Penetrate with the bur merely to outline the area. Proceed carefully.*

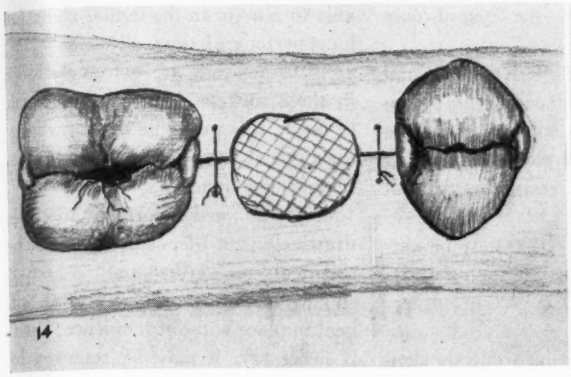
10. *Bone has been removed with drills and small chisel. (Use 701 bur for small areas.) The tooth is exposed. Try not to tear membrane covering tooth.*

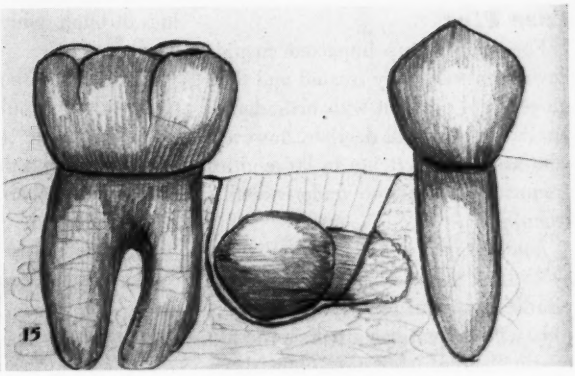
11. *Lined area shows amount of bone removed to expose tooth. The area must be cleared to change the position of the impacted bicuspid.*

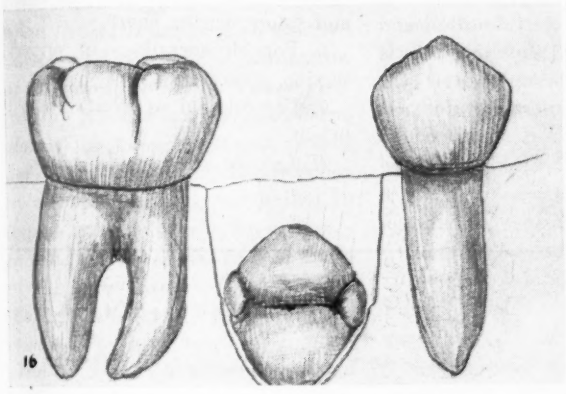
12. *The tooth is gently moved to its new position with a curette or small elevator. The socket from which the tooth was removed is shown.*

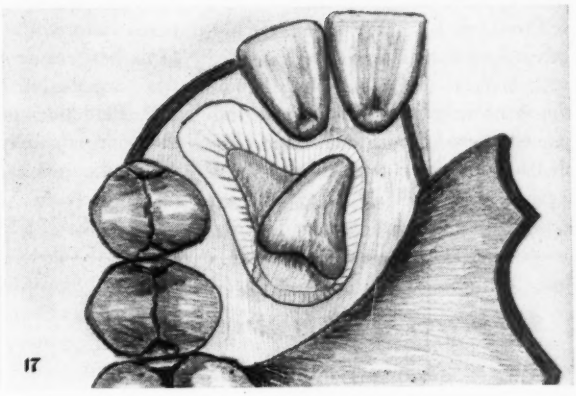
13. *The crosshatch area indicates the position of the pack. The pack is placed to prevent the tooth from returning to its original socket, and to keep a clear area through which the tooth may erupt.*

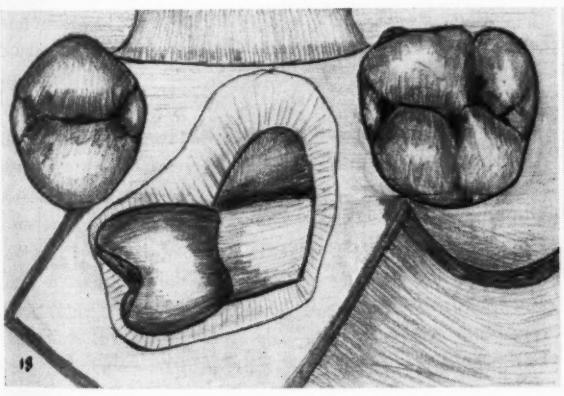


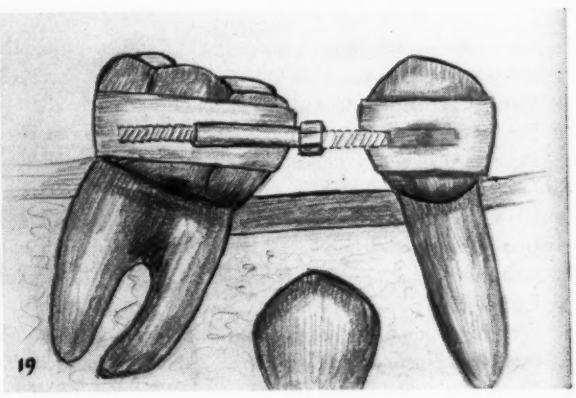












14. *Occlusal view showing exposed pack and sutures in place.*

15. *Horizontal impaction. The same amount of bone is removed if the crown is toward the mesial of bone to be removed on several different occasions.*

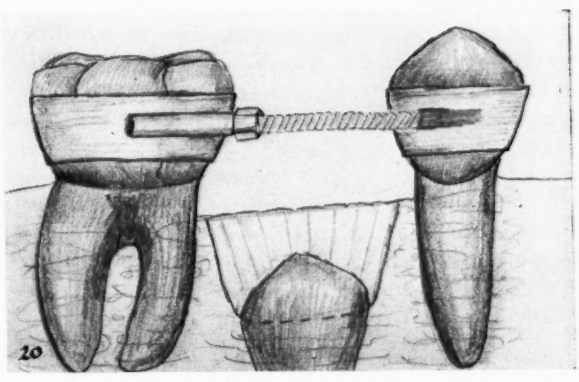
16. *Horizontal impaction. Buccal to lingual version.*

17. *Cuspid impacted in the palate. Bone is removed over the tooth and from socket area where tooth should have erupted.*

18. *Bicuspid impacted in palate. Bone is removed the same whether crown is toward the mesial or toward the distal.*

19. *Orthodontic appliance is placed to make sufficient room for the tooth to erupt.*

20. *Appliance left in place. Bone is removed over the occlusal of the tooth to hasten eruption.*



Case Five

For many years impacted cuspids have been surgically treated and then moved into position with orthodontic appliances. General dentists, however, who are not practicing in large cities frequently hesitate to undertake this technique.

Later Eruption Without Appliances—Without the use of orthodontic appliances, most of these impacted cuspids will erupt through the properly operated area. After the tooth is visible it may be moved into position with appliances.

Procedure—1. Extract the deciduous cuspid if it is present.

2. Deflect the tissue and expose the bone over the crown of the impacted cuspid. Sharp chisel and bone drills are used to make a large opening through which the cuspid may erupt.

3. Cut away the gingival or palatal tissue which would cover the crown when the tissue is sutured back into place. The tooth should erupt through this opening where resistance will not be encountered.

4. A second operation may be necessary in a few cases (Figs. 5 and 6).

Comments

1. Try to prevent injury to the dental follicle at all stages of the operation. A small tear, however, does not mean failure. Uneventful eruption of teeth has occurred after this follicle was torn during the operation.

2. Plan the operation carefully so that surgery may be completed as quickly as possible. Children are unable to remain in the dental chair for long periods of time.

3. These teeth are extremely loose in their sockets. If they are difficult to move, it is probable that overhanging bone is the obstacle. In this case, remove the bone.

4. If a partly formed tooth is drastically out of position, do not be skeptical, move the tooth where it should be. More than likely it will heal in place without incidence. Later, if necessary, it may be removed by simple extraction.

5. Keep chisels, drills, burs, scalpel, and suture needles sharp.

6. For all operations in surgery, suction is necessary.

7. Careful cold sterilization is sufficient.

Hedgecoke and Grand Avenue.

Climacteric Symptoms*

ELMER L. SEVRINGHAUS, M.D., New York

	In Males Per Cent	In Females Per Cent
Nervousness, subjective	100	96.3
Potency, decrease	94.9	-----
Menstrual disturbances	-----	98.9
Depression	89.4	61.8
Decreased memory, concentration	86.5	53.3
Fatigability, lassitude	75.7	76.5
Loss of self-confidence	70	-----
Disturbed sleep	64.9	61.9
Irritability	59.4	64.4
Excitability	51.3	76.5
Fear of impending danger	51.3	-----
Occipitocervical aching	51.3	43.8
Numbness and tingling	51.3	27.1
Vertigo	48.6	70.9
Hot flashes	46	92.1
Headache	46	37.5
Constipation	43.2	72.7
Palpitation, dyspnea	40.5	60.2
Weeping	37.8	61.8
Sweating	35	-----
Scotomas	35	45
Itching	29.7	-----
Personality changes, unsociable	27	-----
Desire to avoid crowds	27	-----
Vague pains	24.3	-----
Cold hands and feet	21.6	30.7
Thoughts of self-destruction	19	-----
Psychoses	13.5	26.7
Formication	13.5	23.2
Tinnitus	10.8	-----
Self-accusatory	5.4	-----
Attempted suicide	5.4	-----

From *Management of the Climacteric*, Springfield, Illinois, Charles C Thomas, 1948, p. 25.

*Werner, A. A.: Male Climacteric: Additional Observations of Thirty-Seven Patients, *J. Urol.* **49**:872-882 (June) 1943.

BODY CHEMISTRY

in Health and Disease—Part Ten

MELVIN E. PAGE, D.D.S.
and D. L. BROOKS, A.B., St Petersburg, Florida

DIGEST

Utilization of food is dependent upon those factors which control the breakdown and assimilation of the food elements. These controlling factors are the endocrine glands. Because natural foods have been altered by the ingenuity of man, man is compelled to apply conscious thought, not only to food choices, but to the study of the mechanics of utilization. Man's inherent ingenuity increases the problems of his survival and necessitates improved understanding and self-discipline if his adaptation to self-imposed changes is to be successful in assuring the continued existence of mankind.

Metabolic Malfunction the Origin of Pathologic Conditions

"Reduced to a cellular or enzymatic basis, it is probable that a great number of pathologic conditions have their roots in *metabolic malfunction.* Although all these metabolic processes operate within the genetic framework of the individual, it is apparent that many should be susceptible to attack by *nutritional means*—in a very broad sense. It is quite likely, therefore, that the genetotrophic disease concept may be applicable to a very diverse group of illnesses in addition to alcoholism, mental disease, and cancer. They may well be the most practical approach to the investigation of *degenerative disease* and to the entire problem of geriatrics, and may make possible *preventive treatment* before extensive and irreparable damage has occurred. In effect, man's life span could be prolonged to more nearly its theoretical length, and at the same time this would help solve one of the great problems of our time; namely, the premature deterioration of the human individual. The prolongation of human creative productivity for even a short time would prevent untold cultural and economic loss."[1]

Control Gained Over Infectious Diseases—Modern medicine has performed a noteworthy service in overcoming epidemic disease. However, the techniques and principles used successfully in conquering these enemies of mankind are the methods of an army pursuing an *offensive attack* upon a unit capable of separate existence. In epidemic disease man is the host, bacteria the invader, and drugs the weapon used to repulse the enemy. Offensive warfare requires recognition of the nature of the enemy and weapons to kill or drive out the invading force.

Change in Method of Attack Required—Basically, degenerative disease is due to breakdown from within. It would seem, therefore, that the mode of attack should be altered to fit the character of the destructive force.

Possible Undesirable Effects of Drugs—Degenerative disease might be compared to a fifth column; it is part of the organism it is destroying. For this reason, drugs that destroy undesirable symptoms may in themselves have deleterious effects upon the body. The destruction of one fifth-column degenerative effect may lead to weakening of the organism and the production of different but equally destructive degenerative effects plus a concomitant lessening of resistance to infectious ills.

Principle of Systemic Approach—The systemic approach to degenerative disease is predicated upon the principle of *increasing the efficiency* of the total *organism itself*, not upon destroying an invading force outside the organism. Thus the systemic approach to all degenerative diseases is basic whether applied in a general medical practice or in one of the specialties such as orthopedics, pediatrics, osteopathy, or dental medicine. Degenerative disease is common to all of these fields of health.

Coordination of Health Services Required—The problem should not be one of relegating all care for degenerative ills as a monopolistic move to a single branch of medicine, but rather to appreciate the differences inherent in degenerative disease itself as opposed to infectious disease or traumatic injury. Approaching the problem from this point of view it is possible to evaluate the problem more clearly and recognize the mutual responsibility of all health services in combating the common enemy.

Nature of Research Conducted—Dental caries is found in 95 per cent of the population. Other degenerative processes, such as arthritis, heart disease, and cancer are rapidly increasing despite well-known research endeavors and enormous financial backing. Most research in this field seems to be based largely on studying end results; that is, abnormality of cell structure in cancer, x-ray studies of bone deformities in arthritis, or control studies on the effectiveness of drugs, ACTH, cortisone and butazolidin, or fluorine for dental decay, ad infinitum.

[1]Meffered, Roy B., and Loefer, John B.: Genetotrophic Disease, Science **118**: (May 1) 1953.

Problem of Degenerative Disease

It is known that cancer cells are abnormal, that drugs such as fluorine may reduce dental decay, that surgery disposes of end results of degenerative disease such as a cancerous tumor: but the problem is that of the *causes* within the organism itself.

Palliative Measures in Treatment Insufficient—Dependence on drugs and surgery to combat degenerative ills leads all too often to further disaster. The breast cancer is removed only to be followed by cancer of the lungs. Tooth cavities are filled only to be followed by others. Drugs are used to combat the pain of arthritis only to be followed by anemia or abnormal retention of fluids. Disease symptoms are eradicated, but the cause of the disease remains. The multitudinous recurrence of such situations, in addition to the rapidly climbing statistics on degenerative disease would seem to be conclusive evidence that a new premise of attack must be established.

Professional Responsibility—Bacterial disease has been conquered. This achievement will always stand as a great tribute to the medical profession. But past accomplishments need not blind us to future responsibility, nor would the healing professions wish it. Industry is struggling with the task of conversion from a concept of industrial oligarchies to a concept of incentive and cooperative management. The healing professions likewise are resisting the necessity for cooperative service and joint responsibility to the patient. Maturity of group thought develops more slowly than individual maturity. The dental profession, with long experience of specialization in the degenerative process of dental decay, is in a position to add much to the advancement of professional group thinking toward degenerative disease.

Relationship Between Diet and Degenerative Disease

A greater awareness of the relationship between diet and degenerative disease seems to exist among the dental profession than the medical profession. Although there are differing explanations for the role played by sugar in dental caries there is, nevertheless, wide acceptance of the view that sweets should be omitted from the dietary. Medical men who eschew the use of sugar are in the minority despite excellent books such as "Body, Mind and Sugar" by Abrahamson, and "Diet Prevents Polio?" by Sandler.

Vitamin C Factor in Disease Resistance—Even members of both professions who are intelligently nutrition conscious often accept the dictates of others in formulating nutritional programs. Vitamin C, for example, is an important factor in maintaining disease resistance, but merely because citrus fruit contains valuable supplies of vitamin C is not a reason for advocating it in large amounts.

Natural Limiting Powers—Fruits were intended by nature to be eaten, not drunk. The "dial" for food would signal when sufficient acid had been consumed. The "dial" for thirst, on the other hand, is not qualified to judge what are safe amounts of *liquefied* foods for the body economy. The blood pH can be altered by an excess of fruit juice. The blood pH is an extremely critical factor in determining calcium precipitation and other chemical processes within the body. It must be 7.4: no more, no less.

Human "Dialing" System Disregarded—For such a mechanically minded civilization man is strangely unconscious of his own "dialing" system. No one would expect his radio or television set to function normally if the wires to the starting dial were attached to the volume control. Man knows much about mechanical gadgets, little about his body mechanics. One machine is a lifetime possession, the other can be replaced. Of the two, which is better known?

Milk in the Diet—Because of its calcium content, milk is popularly believed to be a nutritional necessity. The source of calcium available to the cow is also available to human beings. It is questionable if milk produced by a cow who cannot nurse her own calf is good for human infants. Do native people, known to be unusually healthy prior to invasion by civilized people, consume regular or large amounts of milk?

Essential Elements Similar in Successful Diets—In "Nutrition and Physical Degeneration" by Weston Price reports are to be found of many native people in various parts of the world living on different diets and yet maintaining health. It was Price's contention that broken down into their component parts, all these diets contained similar essential elements. The outside color, shape and taste of the food was unimportant as compared to its inner quality, or substance. The Eskimos on a diet composed chiefly of fish, the South Sea Islanders on fish and a high fruit diet, other island people on oat products and sea foods, the Hunzas on their vegetable and grain diet, all maintained health.

Special Diets for Special Needs—All these people sought special foods in case of illness or at time of extra demand upon the organism; for example, the Masai Negroes fed cooked red blood cells to their people for meat. The children and pregnant women received blood plasma. Among some native peoples fish eggs were dried and used as food for growing children. The fish eggs were recognized as an important source of valuable elements for growth and reproduction. The differing types of food were given according to the requirements of those who consumed them.

Food as a Combination of Components—Civilized man considers diet if his farm animals are ill, drugs if his children are ill. The natives treat both animals and human beings with equal wisdom. All the foods of these native people were natural in form and, generally speaking, fresh. This meant that they contained not only natural vitamins and minerals, but also the synergists which magnify their dietary value. Is it not time that more emphasis be placed upon a study of body needs as a totality, and of food values as a combination of components, not as single factors?

Basic Requirements of Diet

A satisfactory diet should supply the following:

1. All the essentials: protein, fats, carbohydrates, minerals, and vitamins. The form of these does not matter. Proteins are the building foods; fat and carbohydrates the energy foods; building and maintenance, being the chief needs, lay the greatest burden of need upon proteins.

2. Diet should add nothing harmful to the body, poisons or chemicals, or foods in forms which the body is not physiologically capable of handling without strain or damage; for example, poisons—sugar.

Limitations of Dietary Effects—It is, of course, essential that too much is not expected from a good diet. Some people eat well but are not well. Others defy good sense, gratifying every whim of appetite, and flaunt robust health. Obviously diet alone is not responsible for the difference between these people. Diet cannot change constitutional factors. If a child is born with a withered arm, diet is not expected to change it. It is unreasonable to assume that in general a good diet will correct less obvious or hidden defective factors in constitution.

Some Dietary Goals—Diet is not merely a source of energy. Too much dietary instruction is based primarily on the principle of energy. Too many of the working units of the body are treated as expendable when energy is a goal of dietary planning. Diet must provide more than fuel for activity. It must supply maintenance and building material. Generally speaking, faulty body parts cannot be replaced with new ones. Worn-out organs cannot be removed and rebuilt ones substituted. Rebuilding can be accomplished only through an adequate supply of raw materials and an adequate mechanism of utilization.

Diet a Source of Raw Materials—The living organism is the end product, energy the by-product of diet. When the purpose of diet is seen in relationship to the end product instead of the by-product the missing link in dietary thinking is supplied. The effect of diet is limited by the mechanism of utilization.

Utilization of Vital Importance

Excellent raw materials may be supplied, but unless the body can properly convert these substances into the elements required by the body for growth and maintenance, the satisfactory end product of a healthy body cannot be achieved. There is at present an awakening interest in the two factors so essential in understanding diet, (1) the quality of the food taken, and (2) the body's ability to utilize food.

Factors Controlling Assimilation of Food—Utilization of food is dependent upon those factors controlling the breakdown and assimilation of the food elements. These controlling factors are the endocrine glands. Directly and indirectly glandular activity determines what enters the blood stream and, barring mechanical interference, how it is to be transported throughout the body. To attain an efficient body mechanism, therefore, correct diet plus adequate assimilation must be assured.

Knowledge of Mechanics Necessary—Originally instinct dealing with natural foods dictated food choice and quantity. Now that natural foods have been altered by the ingenuity of man, man is compelled to apply conscious thought, not only to food choice, but to a study of the mechanics of utilization. Man's very ingenuity increases his problems of survival and necessitates increased understanding and self-discipline if his adaptation to self-imposed changes is to be successful in assuring the continuation of mankind.

Point of Reference Provided—A study of the mechanics of utilization requires a point of reference upon which to base a judgment of efficiency; a means of checking progress or regression. As outlined in previous articles, the calcium-phosphorus ratios serve as a *point of reference*, and repeated blood analyses as a means of evaluating regression or improvement. Body measurement tests provide clues as to endocrine needs: the minute endocrine needs of the average person.

Results of Functional Disturbance—"If in fact a slight hypersecretion of growth hormone can be associated with metabolic changes but unaccompanied by the obvious stigmata or acromegaly, then a wide field of clinical investigation may await exploration. It may be that the grotesque conditions ascribed classically to endocrine hypersecretion represent only the extreme and obvious results of a disturbance of function which may be seen in more subtle and perhaps qualitatively different aspects."[2]

Clinical Evidence Supplied

Case histories have demonstrated the interrelationship of degenerative processes occurring in different parts of the body; for example, arthritis and dental ills, high blood pressure and ridge absorption, weight distribution and dental caries, all stemming from a common systemic cause and registering in abnormal blood sugar levels and calcium-phosphorus ratios. Case histories have further demonstrated the effectiveness of minute amounts of glandular substance (insulin, thyroid, posterior pituitary, anterior pituitary, the sex hormones, and adrenal cortex) in changing blood sugar levels and calcium-phosphorus ratios. The relationship between dental ills and blood levels of sugar, calcium, and phosphorus has been illustrated.

Clues to Treatment—The response of oral ills, caries, pyorrhea, and ridge absorption to correction of blood levels of calcium and phosphorus and sugar has been described in detail. The relationship between the differing types of oral ills and differing types of body shape (sympathetic, parasympathetic and mixed endocrine types) has been demonstrated as a clue to systemic treatment of degenerative processes.

Study of Body Types

This study leads to the conclusion that endocrine activity, inherited or

[2]Young's Syndrome, Br. M. J. **4837**:668-669 (Sept. 19) 1953.

acquired, determines calcium-phosphorus assimilation, weight deposition, and bodily efficiency. Readjustment of endocrine activity through a permanently corrected diet and temporary endocrine supplementation can improve calcium-phosphorus ratios, weight deposition, and bodily efficiency.

Response to Systemic Approach—If degenerative disease, in its different manifestations, responds to this common systemic approach, it must be logical to look to systemic factors for the cause, cure, and prevention of these processes. Why then are millions spent in the search for a drug to annihilate an invader when the answer lies in building resistance against breakdowns from within? Rather than studying disease and searching for drugs, healthy physiologic human processes should be studied and man envisioned as a totality.

Indicator of Susceptibility—A recognition of the fundamental importance of body shape as an indicator of disease susceptibility is essential in an approach to the problem of degenerative disease. The body heralds its constitutional makeup, its inherited strength and weaknesses. It should serve as a starting point in the study of the cause, cure, and prevention of degenerative processes.

Restoration of Efficiency—As in restorative dentistry where the dentist is guided by the shape of the oral cavity (the total area of the problem), the interrelationship of one jaw to another (recognition of interdependence of the parts), shape and size of the teeth (the limitations of the working mechanism), so in restoration of body efficiency the physician should be guided by the following conditions:

1. General body size and shape (the total area of the problem).
2. The interrelationship of the two halves of the body, (recognition of the interdependence of parts).
3. The activity or inactivity of the glands (the limitations of the working mechanism).

Systemic Approach in Dentistry—In the systemic approach to health the scope of responsibility and thinking is enlarged and restorative planning is transferred to the organism as a totality. To bridge this gap is not so difficult for the dentist. The futility of constant repair with gradual reduction of efficiency has led to increasing emphasis upon restoration and prevention in the field of dentistry.

What can dentists do to advance the battle against degenerative disease?

1. The dentist and his family can become good examples of the effect of good diet by increasing their use of whole grains, of proteins, and by the elimination of sugar. The harmful effect of sugar is known from experience even though it is not agreed as to the "why." Until dentists start living as they preach their influence will be little felt among their patients. On the other hand, if all dentists become living examples of the effects of adequate and proper diet, their influence for good would be increased many fold.
2. Those whose practice demands it and whose abilities permit, can, after a brief course of study and with consultative guidance, add this systemic approach to oral problems to the service they now give their patients.
3. Dentists can spearhead a new movement in the approach to the cause, cure, and prevention of degenerative disease, a problem and responsibility resting jointly on the shoulders of all branches of the healing professions.

2810 *First Street North.*

The Dentist's Responsibility

Spinal Compression Due to Skeletal Fluorosis

Signs of Advanced Skeletal Fluorosis—The diagnosis was supported by signs of mottled enamel, osseous changes, such as exostoses and increased density of bones, high urinary excretion of fluoride, and the fact that the water in the village in which the patient had lived contained large quantities of fluorine.

Symptoms—When the patient was hospitalized, there was tingling and numbness all over the body and inability to use the lower limbs.

History—The present illness commenced six months prior to admission. The patient had a brother and an uncle who had stiff backs; his two children had mottling of teeth, which was quite prevalent among children in the locality. Motor power was poor in all four limbs, but definitely worse in the lower limbs. The gait was spastic-ataxic.

Etiology—These and other neurologic changes were the result of compression of the spinal cord and nerves due to abnormal calcification and densification, which could be attributed to protracted ingestion of large amounts of fluorine in drinking water. This was the first case on record in this locality in which fluorosis gave rise to spinal compression. Investigation of the fluorine content of the different wells in the patient's home village suggested that skeletal impairment described as "stiff back" is found to be associated with consumption of water containing 10 ppm of fluorine. Fluorine concentration up to 4 ppm in domestic waters does not seem to constitute such a grave hazard.

Adapted from Medical Literature Abstracts, *Journal of the American Medical Association* **153**:983 (Nov. 7) 1953.

The EDITOR'S Page

ONCE AGAIN the role of carbohydrates in the production of dental caries has been emphasized.[1] In a study made among Finnish Lapps in the years 1939 and 1950 there was demonstrated a direct relationship between the food supply before and after World War II on the caries experience.

Before World War II (1939) the foods among Lapps consisted of "reindeer meat, dried fish, potatoes, rye bread, and margarine. The universal drink was coffee liberally sweetened with sugar. Two noteworthy points are that almost all the salmon was at that time sold to the tourist hotels and that very little fresh fruit was eaten."

When the Germans invaded Finland the food habits of the Lapps were changed markedly. The Lapps went to work for the German occupation troops and in addition supplied them with meat and fish. In turn, the Germans supplied the Lapps with more sugar, cereal, and potatoes. This would be considered a diet low in calcifying power and high in caries producing potential.

In 1944 the Germans were driven from Finland by the Russians. As the Nazis retreated they followed a scorched earth policy. As a result of this action the Lapps from the northern strip of Finland (Inari) were moved to central Finland and many of the Lapps from Central Finland (Enontekio) were evacuated to Sweden. These forced migrations established other kinds of food patterns: those evacuated to central Finland lived on a subsistence diet. Those in Sweden were "better" fed.

Since the return after the war of both the Inari and the Enontekio Lapps to their original homelands, the diet has reverted to the 1939 pattern with this difference: "Less fish is sold to tourists and the Lapps seem more conscious of eating fresh fruit."

In general, it was observed that the Lapps who stayed in Finland (Inari) and existed on a subsistence diet were in much better dental health in 1950 than those (Enontekio) who moved to Sweden. The ones who moved to Sweden were: "fed well by European standards (with plenty of sugar and vitamin-fortified margarine), while in their homes after their return they were able to trade with smugglers traveling between Norway, Finland and Sweden who largely carried spirits, sugar, and margarine. So in addition to their vitamins A and D intake (contributed largely by the margarine and fresh fruit) being as high as, or possibly higher than, that of the Inari Lapps, their sugar consumption also was much higher. Now since the state of their teeth is so much worse than that of the Inari Lapps, they must have been subjected to factors favoring decay to a much greater extent than the Inari Lapps' teeth. In this case a high-sugar diet might be incriminated."

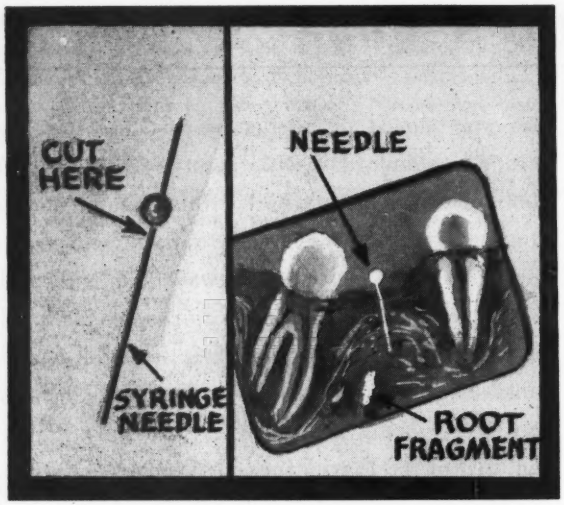
The conclusion here is the traditional one that the presence of easily *fermentable* carbohydrates is the cause of dental caries. This theory presupposes that caries is strictly a local event whereby easily degraded carbohydrates are broken down by bacterial action to produce acid that attacks dental hard tissue.

A broader and more tenable biologic position has been expressed in a series of articles written by Melvin E. Page and his group that has been appearing in this publication.[2] Page believes that refined sugars are cariogenic (and also initiate many other disease processes) because they disturb the calcium-phosphorus balance of the blood. He envisions dental caries as a metabolic and degenerative disease. The lesions of caries are local but the cause of the lesions is biochemical considered in the framework of the organism as a whole rather than the restricted area of a local biochemical imbalance.

In general medicine the fragmentation, local concept of disease is giving way to the total organismal concept. It is time that dental thinking got in tune with this broader base of biologic orientation.

[1]Jones, R. Holmes, and Mynott, M. J.: Dental Health in Lapland, Br. M. J. No. 4863:683-684 (March 20) 1954.

[2]Page, M. E.; Brooks, D. L.; and Daly, R. B.: Body Chemistry in Health and Disease, DENTAL DIGEST **59, 60**:September 1953-June 1954.



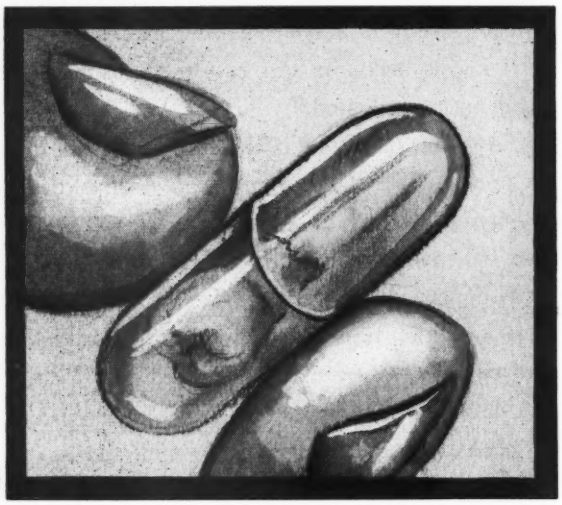
1

Clinical and Laborato

X-ray Localization of Embedded Objects

Albert Coonin, D.D.S., Miami, Florida

1. Clip off the large end of a hypodermic needle next to the ball stop. The short end may be inserted into the tissue in the neighborhood of the embedded object and an x-ray taken. The needle may be left in position until the x-ray is processed and the surgery begun.

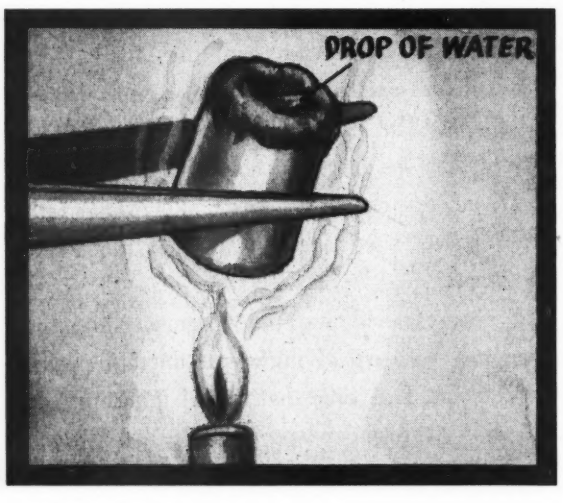


2

Use for Acrylic Crown Form Capsules

T. J. Klopman, D.D.S., Bronx, New York

2. After removal of a deciduous tooth return it to the child in an acrylic crown form capsule. This is convenient for him to carry and to exhibit.



3

A Band Impression Technique

George L. Kennedy, D.D.S., Villa Grove, Illinois

3. While the modeling compound impression material is warm make a cup-shaped dent in the material. Put a drop of water in the dent and then make the final warming over the Bunsen burner before pressing to place. The drop of water prevents overheating or sticking of the modeling compound.

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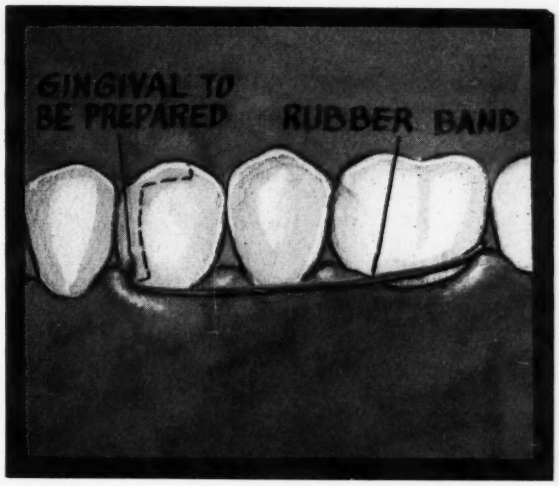
SUGGESTIONS . . .

Cavity Preparation Below the Gingiva

Irwin Fine, D.D.S., Brooklyn, New York

4. In preparing a cavity below the gum margin bleeding may be controlled by stretching a rubber orthodontic band between the preparation and another tooth in the quadrant. *Be sure to remove the band before dismissing the patient.*



4

A New Spray for Home Use

Cecil O. Garton, B.S., D.D.S., Inglewood, California

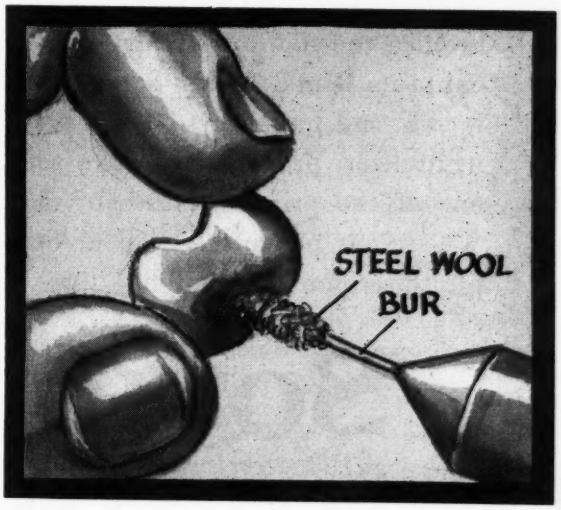
5. Use a sterile Windex glass-cleaner bottle and spray attachment as a mouthwash spray for home use.

5

Cleaning Inside a Cast Crown

Robert Sterinbach, D.D.S., Brooklyn, New York

6. Wrap a piece of steel wool around a cross-cut fissure bur. Revolve the instrument inside the casting to remove all debris.



6

technique involved; and jot down the advantages of the technique. This shouldn't take ten minutes of your time. Turn to page 282 for a convenient form to use.

Send your ideas to Clinical and Laboratory Suggestions Editor, DENTAL DIGEST, 708 Church Street, Evanston, Illinois.

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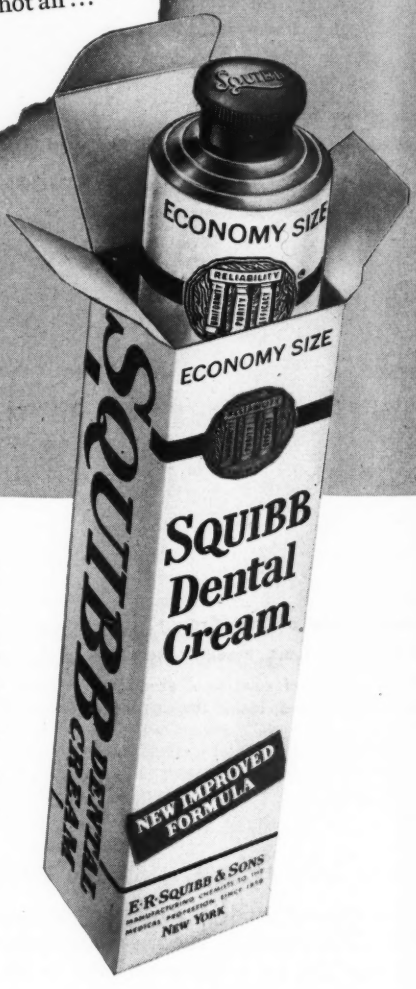
—JOURNAL OF THE ADA
EDITORIAL, 48: 202
FEBRUARY, 1954



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Cancer of the Tongue

Cancer of the tongue was considered a surgical problem when it first received attention. Then it became an irradiation problem. And now it is becoming a surgical problem again. The results of surgical treatment, while far from ideal are superior to the results of irradiation therapy, particularly with respect to cervical lymph nodes. Carcinomas of the posterior third of the tongue, however, are frequently of a highly undifferentiated type and respond better to competent irradiation than surgery.

In theory, every carcinoma of the tongue should be widely excised. A bilateral complete excision of the upper and lower cervical lymph nodes should be carried out to offer the patient his best chance of survival.

In practice these procedures involve at least three major operations. In most clinics an attempt is made in the individual case to fit the operation to the extent of the disease. In some cases, excision of the primary lesion is combined with homolateral upper neck dissection alone. In others a bilateral upper neck dissection is done. In a third group a complete neck dissection is done on the side of the lesion and an upper neck dissection on the opposite side. Complete bilateral neck dissection is done in relatively few cases.

From records collected over a period of time it is learned that in approximately half the cases that appear for treatment there is failure to completely excise or destroy the lingual cancer. The five-year survival rate in patients without cervical metastasis does not, as a rule, exceed 50 per cent. In general, the five-year arrests in patients without cervical lymph node metastasis have been approximately 45 per cent. In patients with proved cervical lymph node metastasis the five-year arrests have been approximately 15 per cent. The five-year survival rate in patients with bilateral cervical metastasis has not been determined, but undoubtedly it is low.

MacFee, W. F.: Surgical Treatment of Cancer of the Tongue, New York State J. Med. **53**:163-171 (*January* 15) 1953.

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Emotional Factors in Poliomyelitis

The psychologic impact of poliomyelitis is great. The disease may cause hysteria in the community and great anxiety on the part of the patient and family.

When respiratory function is impaired, orientation of the patient and family about the future is particularly important. The proper beginning is made by the family physician. Community facilities, hospital policies, and financial problems should be discussed.

Patients with bulbar, bulbospinal, or cervical involvement are especially dependent. The respirator patient must be treated in a friendly efficient, and confident manner. Management should fit emotional needs and individual requirements.

When several physicians are caring for a patient, one, preferably the internist or pediatrician, should assume responsibility for direction.

A full, candid answer to the patient's questions may be unnecessarily brutal. Too evasive a reply, however, sometimes destroys confidence. Deception may be necessary, temporarily, but can turn out to be more traumatic than the truth. Describing the respirator as a "short-term test" or attempting to decrease the respirator pressure without the patient's knowledge may result in loss of faith.

Labeling the respiratory cripple's complaints as neurotic is dangerous. Restlessness, increasing anxiety, irritability, and flushing may be symptoms of altered respiratory physiology.

And finally it is very important that the religious needs be fully recognized.

Grulee, Clifford G.: Some Emotional Problems Associated with Respiratory Insufficiency in Poliomyelitis, Pediatrics **10**:444-449 *(November)* 1952.

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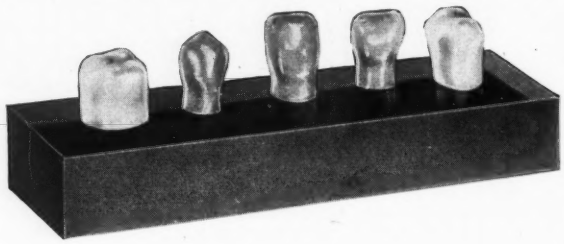

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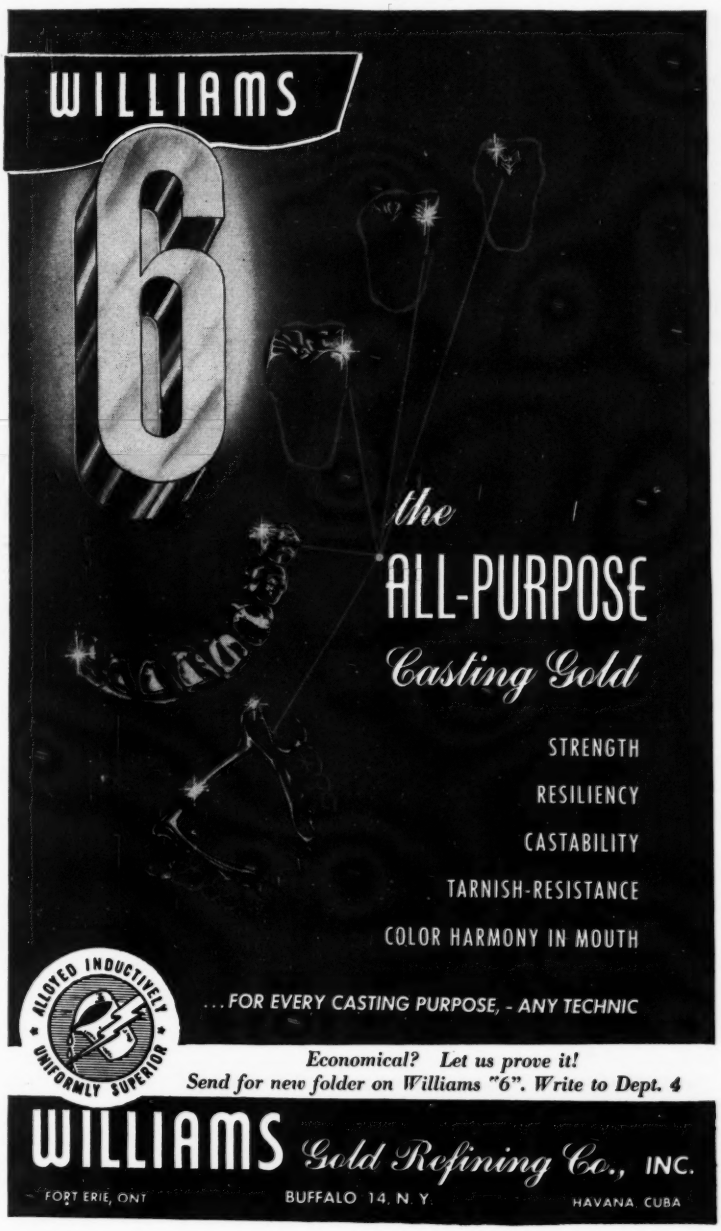
Today, the plastic surgeon can advise older people about methods by which they can appear younger and thus be happier in a society which places a premium on youthful features.

The face on the young and beautiful person can be divided into three areas of equal vertical space. These are: (1) the area of the forehead, (2) the area of the nose, and (3) the area of the mouth and chin. The critical vertical dimension is the area of the lower third of the face. This area is from the bottom of the nose to the bottom of the chin.

The facial contour is normally guaranteed fixedness and integrity by three broad rings of muscles. Two are the orbicularis oculi encircling the eyes. The third is the orbicularis oris, the thin band of muscle stretched around the mouth. All three muscle bands are held in balance with each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other by their attachments with the other facial muscles.

In aging, the zygomatic major muscle which is attached to the lateral corner of the orbicularis oris loses length and motility. As it becomes more fixed it causes characteristic folds near the mouth. The platysma muscle loses tone and becomes more fibrous and the skin below the chin may "double" if the person is fat, or may become redundant if the person is thin.

Teeth are usually lost in aging. The remaining molars are ground down by mastication. They lose some vertical dimension intrinsically. There is some absorption and diminution of the size of the mandible. There is loss of vertical dimension of the lower third of the face.

With these anatomic changes the masseter loses tone. The loss of muscle tonus as a factor in facial aging is apt to be belittled. The loss of vertical dimension plus the atrophy of the areolar connective tissue results in the accentuation of the nasolabial fold and the skin of the cheeks becomes pendulous.

As the age increases the histologic picture of the connective tissue below the skin changes to show an increase of collagenous tissue and a change in physical properties and arrangement of elastic fibers. There is also diminution of muscle volume of the facial musculature with age.

In aging the chin becomes closer to the nose. Also the elastic tissues of the nose atrophy. The nose slowly responds and elongates in a vertical dimension. The chin goes up and the nasal tip goes down. The skin of the cheeks begins to hang in wrinkles, bags and folds, for it no longer is as fully filled by its skull, teeth, and its other contents, as in youth. Baggy eyelids also tend to give the face an atmosphere of advancing years and decrepitude. Overhanging upper lids are seldom caused by anything other than redundancy of aging skin.

Plastic surgery can ameliorate this aging effect by (1) the face lift, (2) shortening of the nose, and (3) removal of bagginess of the eyelids. The face lift excises the excess facial integument and reapplies the tightened skin of the cheeks to a higher and more youthful position upon its underlying muscles. There it is anchored, with the telltale sutures hidden behind the hairline and behind the ears. The amount of skin to be removed is best judged with the patient in an upright position. The elongated nose tends to cause the upper lip to seem shorter than it actually is. Plastic surgery can increase the vertical dimension of the upper lip by shortening the nose. It makes the upper lip easier to see.

At the time of a facial rejuvenation operation the teeth should be inspected with a view to restoring the vertical dimension of the mouth with dentures or other dental prosthesis plump enough to literally refill the mouth with teeth. This will help to iron out the wrinkles about the lips.

Brown, Adolph: Surgical Restorative Art for the Aging Face, J. Gerontol. **6**:173-184 (*April*) 1953.

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Help to Control Your Nerves

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Good, strong arguments could be advanced to show that nervousness in some forms represents a biochemical imbalance. But even this explanation is not the entire story. Nervousness is a price that man pays for having a conscience. Conscience makes us introspective and aware of all our failures, frustrations, and shortcomings. It makes us dwell on the past and project into the future. It nurtures doubt, indecision and nervousness. Will is the positive force that was intended for man to use to strengthen and better himself. It is an exclusively human attribute.

Consciously trying to strengthen ourselves and to use Will to promote this desirable end are powerful antidotes to nervousness, the "universal disease of our times." In a profoundly fine book, MENTAL HEALTH THROUGH WILL TRAINING, Abraham A. Low, the founder of Recovery, Incorporated shows that man has the power within himself to use his strength of Will to overcome anxiety and defeat.

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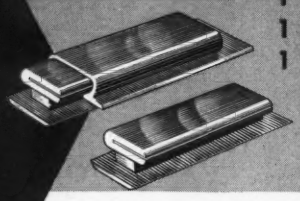

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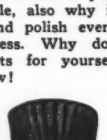

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transitory symptoms that include tightness of the chest and head, palpitations of the heart, dizziness, fear of collapse, fatigue, insomnia, dimness of vision, nausea, air hunger, and sweating.

2. The nervous *patient* (one who seeks treatment for his distress) has usually three fears: of physical collapse, of mental collapse, of a permanent handicap. His symptoms are usually of longer duration than those of the nervous person.

3. Life is not *driven* by instincts but *guided* by Will.

4. There is a vicious cycle in nervous conditions: symptoms increase fear and fear intensifies the symptom.

5. We must learn to control temper which has two components; angry or aggressive temper, and fearful or retreating temper.

6. The nervous patient or person is served by imagination which is out of bounds, rampant, unbalanced. Imagination must be balanced in such a fashion that the sense of security is stronger than the sense of insecurity. We must learn *not* to interpret inner and outer experiences in terms of insecurity. Imagination must be disciplined with the ideas of security and serenity.

7. We must vacate our demand always to be *right* because right and wrong are often opinions, suppositions, assumptions, conjectures, speculations. That means that they are often merely guesses. We never gain a lasting victory by forcing our opinions on others: "refuse to prove that you are right."

8. Muscles are preeminently the teachers and educators of the brain. The brain must be convinced by the muscles that all that is required to shake off nervous fears is to make the muscles do what the cowardly brain feared to do. When the brain is jammed with preoccupation with ideas of collapse and disease, the muscles are leaderless: action turns into inactivity, initiative into paralysis of the will, self-confidence into helplessness and hopelessness. To break this vicious circle *command the muscles* to activity.

(*Continued on page* 281)

9. Nervous fatigue is discouragement and disgust.

10. Avoid emotionalism and sentimentalism. Emotionalism means that plain and innocent sensations and experiences are so alarming that nothing short of an extraordinary fear reaction suits the situation. Sensationalism means that equally plain and average experiences are viewed as so exalted and valuable that nothing short of an excessive sense of duty and responsibility can meet the requirements of the momentous event.

11. If you fear to do something you do not fear the thing itself but you fear the resulting sensations; you fear being embarrassed or self-conscious. The simple cure is: Do what you fear to do and brave the sensations.

12. Temper is the worst enemy of the nervous person and humor his best friend. The control over our internal environment is more important than all the possible triumphs we may be able to score over the external environment. Learn to make fun of ourselves and our symptoms. They are distressing but not dangerous. Do not anticipate danger.

13. We must learn to distrust our feelings. Feelings are not facts. They deceive us. They lie because an incorrect and deceptive thought is often attached to them.

14. Emotions are of two general kinds: (A) stimulating emotions—love, devotion, enthusiasm, sympathy. (B) frustrating emotions—fear, anger, despair.

15. Learn to relax your body, your thoughts, and your feelings. Relaxation produces a tension-free body, a serene spirit, a mood of comfort. Relaxation or tension are total experiences. If your attitude is one of security your total self is devoid of strain, tenseness, commotion, and excitement. If your attitude is one of insecurity, your total self is the exact opposite: strained, tense, perturbed, excited.

16. We must train our Will to decree that no danger exists. This is real thought control. The equation for thought control might be written:

No thought of danger=a feeling

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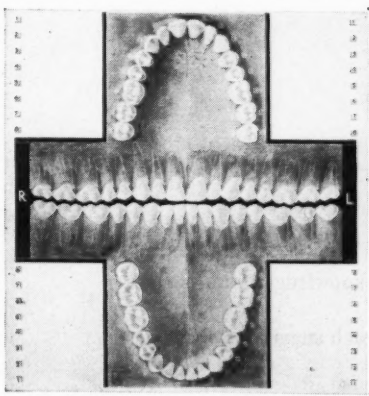

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CLINICAL AND LABORATORY SUGGESTIONS

(*See pages* 270 *and* 271)

Form to be Used by Contributors

To: Clinical and Laboratory Suggestions Editor

DENTAL DIGEST
708 Church Street
Evanston, Illinois

From: _____

_____

Subject: _____

Explanation of Procedure:

Sketch:

Suggestions submitted cannot be acknowledged or returned.

$10 will be paid on publication for each suggestion that is used.

of safety and security
a secure feeling=relaxation
relaxation=freedom from tension
no tension=no distressing symptoms
freedom from symptoms=a serene and adjusted personality

17. Nervous fear is the fear of discomfort. We must develop the Will to bear discomfort. Discomfort is not danger. The moment the feeling of danger rises in the brain, the patient must *instantly spot* the condition as one of severe discomfort with no danger attached.

18. Finally, self-control by Will power means self-respect.

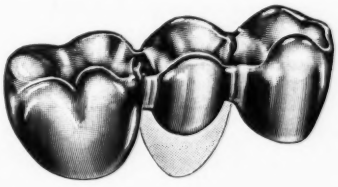
Rats Know More

Starvation and malnutrition have had the headlines. It is just as easy to die from eating too much. The constantly rising death rate from the degenerative diseases goes hand in hand with the rising tide of economic fortune. The more money a person makes, the more likely he is to live high off the hog and generously from the bottle. The cocktail party is the badge of economic success. The poor have not yet taken over this social practice.

In addition to alcohol served at a cocktail party, there are usually many forms of hors d-'oeuvres which are always abundant in calories and richer still in augmenting thirst. After filling well on liquor and tidbits it is customary for the cocktail party to adjourn to a restaurant known for rich and expensive foods. Well along in the midnight hours the revellers disperse and stumble into their beds with hearts heavily pounding and viscera acutely distended. Such is an evening of hypernutrition.

It will be shocking to many of us cocktail party devotees to learn that the Norway rat has better sense than we have. I am not familiar with the Norway rat but if he has the mannerism of the American alley variety, I am sure I would dislike him without closer acquaintance.

My knowledge of the behavior of the Norway rat comes from his devotion to scientific study. A serious minded scientist, C. P. Richter, en-



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listed the cooperation of a group of Norway rats in his study of alcohol, beer, and wine as foods.

Doctor Richter has been quoted in the JAMA as:

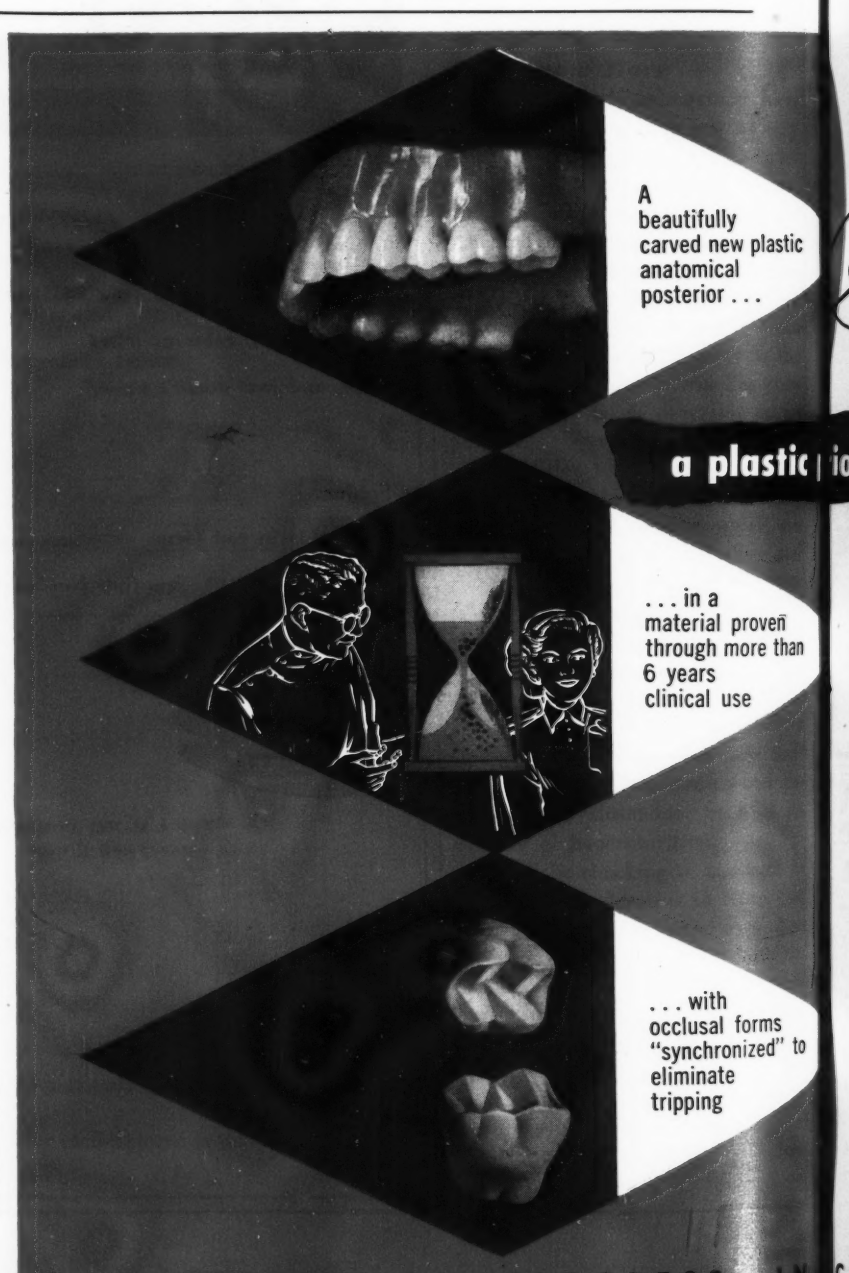
"Many Americans believe that alcohol needs food to dilute or absorb it and the greater the amounts of imbibed alcohol the greater are the amounts of food that must be ingested. They regard alcohol as a drug and a 'stimulant' that does not contribute directly to their diet. They do not consider that an ounce of alcohol represents almost twice as many calories as an ounce of sugar. Nor have they considered the possibility that calories from imbibed alcohol added to those from energy foods may supply far more energy than a person needs."

Now the attitude of the Norway rat was examined to see if he, like men and women at a cocktail party, ate and drank too much. Here is the way the Norway rat is reported to have reacted to his food and alcohol:

"The author described three series of experiments on rats. In one series the fluid consumption of rats was restricted to either an 8, 16, or 24 per cent solution of alcohol for 265 days. *The animals reduced their food intake in proportion to the calories obtained from alcohol.* During this period they showed no signs of deficiency and gained weight at the same rate as before the experiment. In a second series of rats, the fluid intake was restricted to a table wine containing 12.5 per cent alcohol by volume. The animals drank the wine, but in smaller amounts than tap water, and reduced their food intake in direct proportion to the calories obtained from the wine. In a third series, the fluid intake of rats was restricted to beer. The animals drank about twice as much beer during the experiment as water during the control period; they drank 2½ to 3 times as much beer as animals in the second series of experiments drank wine. Food intake was reduced in direct proportion to the caloric volume of the ingested beer. Although the volume intake of beer greatly surpassed the intake of wine, the caloric intake was exactly the same, beer having a much lower number of calories. While drinking either beer or wine, the rats gained weight at a normal rate and showed no dietary deficiency. These experiments confirmed that rats do not spontaneously consume more than a certain number of calories. *Persons who drink alcohol should be made aware that they should eat less rather than more food when drinking alcoholic beverages and that food intake should be reduced in proportion to the caloric intake from the ingested alcohol.*"

This scientist, preoccupied as he was with caloric values, did not suggest another danger from curtailing food when alcohol is taken. This is the very real danger of getting drunk on an empty or scantily filled stomach. Better to add a few extra calories to yourself than to be objectionably drunk.

I would dislike to think that the moralist or the temperance lecturer would pick up this story of the Norway rat and dramatize it to the world. If these people insist on pointing some moral from these scientific ex-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. . . in a material proven through more than 6 years clinical use
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LEADERS OF PROGRESS

periments, it might better be that drinking and eating too much leads to hypernutrition, which leads to obesity, which in turn points the way to serious disease.

—E. J. R.

Cancer
MAN'S CRUELEST ENEMY
Strike back—Give
AMERICAN CANCER SOCIETY

CORRECTION

THE HEADING for Table II in the article by Doctor Alfred Taylor, SODIUM FLUORIDE IN THE DRINKING WATER OF MICE, which appeared in the April issue was incorrectly worded. The proper heading for Table II is "Sodium Fluoride in the Drinking Water of Mice on a Mixed Grain Diet—5 Experiments."

The Brain and Its Work

THE TAKING of a morsel of food is an act presenting successive phases. An initial phase deals with the morsel in the mouth. During that phase there is a finely regulable moving of the morsel about, moistening it, and so on. This involves cooperation between the lips, the tongue, the teeth. The morsel and what is being done to it are then present to the mind; the mind's "attention" can be turned to it. If it be a delicacy perhaps acutely so. We can maneuver it with the mouth a longer or shorter time. We can, if for instance the morsel be unpleasant, reject it. So long as the morsel is within grip of this phase, and is experienced by the mind, our motor act in regard to it remains, we find, open to modification; it would seem, at "will." Finally this phase of the act culminates by directing the morsel from the mouth into the grip of the next phase, the "swallow."

The morsel passes over into charge of an act effective enough for its relatively simple purpose, namely to sweep the morsel into the interior of the body. With that transit the morsel becomes forthwith lost to mind. Not that muscles and nerves are no longer engaged upon it. They have much further active commerce with it. The mind however has no contact with them or it. And no effort of the integrated individual can now delay or hasten or modify in any way the treatment of the morsel. The individual per se cannot, even if the morsel be poison, control further the dealing with it. In short, where the act of the integrated individual can do no more about it, mind forsakes the act. Our inference would be that one use of mind in the individual is to control and modify the individual's motor act.

Sherrington, Charles: Man On His Nature, ed. 2, New York, Doubleday & Company, Inc., 1953, *pp.* 172-173.

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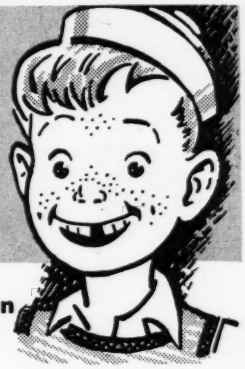

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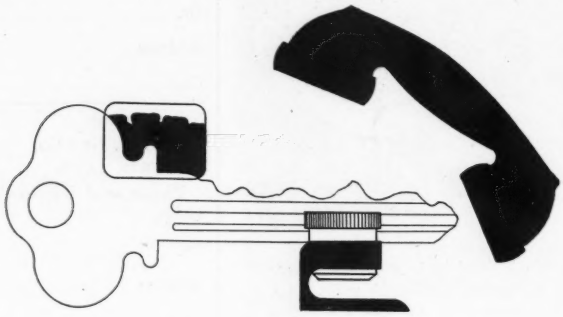

A Key to Successful General Practice

Doctor Bernard Berman explains how he uses bitewing film, a magnifying glass, and his telephone to help patients understand the value of preventive dentistry. His practice thrives by reason of his personal—and very practical—campaign of patient education.

★ ★ ★

Is an economic down-swing imminent? No one can say for sure, but, "regardless of how a dentist may personally appraise future economic developments in his immediate practicing area, he will find the present an excellent time for a careful review," advises M. A. Patrick in explaning "How to Conform to Economic Adjustments."

★ ★ ★

Stuart Covington gives sage advice on how to handle your personal publicity should you be so fortunate as to find yourself in the professional limelight—and, even more useful information on how to "win friends and influence patients" in your everyday contacts. Look for the article, "You Can't Advertise, But—"

★ ★ ★

Daniel S. Schecter suggests ways of anticipating and avoiding fee problems. After interviewing a number of dentists, he finds that most of them agree that "more harmonious dentist-patient relationships have been spoiled by misunderstandings about fees than by any other factor." One Iowa dentist even went so far as to say, "Patients who owe you money are your enemies." You will want to read, "Fee Discussions Pay."

★ ★ ★

"Reward Your Loyal Patients," advises Doctor G. J. Steinberg. Consideration of the patient's convenience and honesty in your dealings with him, pay off in patient loyalty and in patient regard—for both you and your profession.

★ ★ ★

"Another Dentist in the Family" tells the story of Doctor George W. Thompson's partner, his daughter, Mary Louise, and her successful practice of children's dentistry.

★ ★ ★

Doctor John W. Cooke asks, "Is There a Shortage of Dentists?" He believes that the existing problem is not one of actual shortage but of poor distribution, with most practitioners choosing to locate in the larger cities rather than in small towns or villages.

★ ★ ★

The regular Oral Hygiene monthly departments and features round out a highly diversified, and interesting, issue.

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